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Smelting Iron Electrically With Coke as Fuel

Description of This Interesting Process Developed in Norway Where Charcoal No Longer is Available for Pig Iron Production

By H J Hanson

Although iron ore has been smelted successfully with charcoal as fuel, the results from the use of coke in an electric furnace until recently have not proved encouraging. For several years, however, experiments have been conducted in Norway with the use of coke in place of charcoal, and the results have been so gratifying that a plant already has been built containing four electric smelting units, while another is in course of erection and will be placed in operation before the first of the year. The Tinfos Iron Works at Notodden, Norway, is the first plant to successfully smelt iron ore in an electric furnace with coke as fuel, the daily output of the four units aggregating 40 tons.

The power for the Tinfos Iron Works is taken from falls located on the Tinn river in the vicinity of Notodden, Norway. The development was first made for the paper mills located at that point, but has since been extended and much of the power is now used for the direct smelting of iron ore. There are two waterfalls, the lower being known as Tinfos, while the upper one and the last to be developed is called Sagafos, the distance between the two being about half a mile. The first named falls have a drop of about 60 feet and the latter about 30 feet.

Size of Stations

In station No. 1 there are two generators of 2,500-horsepower capacity each, two of 1,000-horsepower each, one 650 and one 300-horsepower, all direct-coupled to horizontal shaft turbines and developing three-phase, 5,000-volt, 50-cycle current.

No. 2 station takes but half of the volume of the water of the upper falls due to prior water rights which could not be acquired. By locating the station some distance downstream the head has been increased from 30 to 80 feet. There are three generators, each having a capacity of 6,600 horsepower and developing current with the same characteristics as the No. 1 station, the stations being connected in parallel.

In 1909 and 1910 the first experiments in the smelting of iron ore by electricity were carried on in Norway and Sweden, the furnaces at that time being constructed to use charcoal as the reducing agent. From 1870 to that time there had been no iron industry in Norway, due to the fact that the price of charcoal had advanced to a point that made the old furnaces unprofitable. Sweden, however, was somewhat more fortunately situated and still continues to use charcoal furnaces,

FIG. 1—GENERAL VIEW OF THE POWER DEVELOPMENT AT NOTODDEN, NORWAY, NO. 1 PLANT AT LEFT AND THE FALLS AT RIGHT

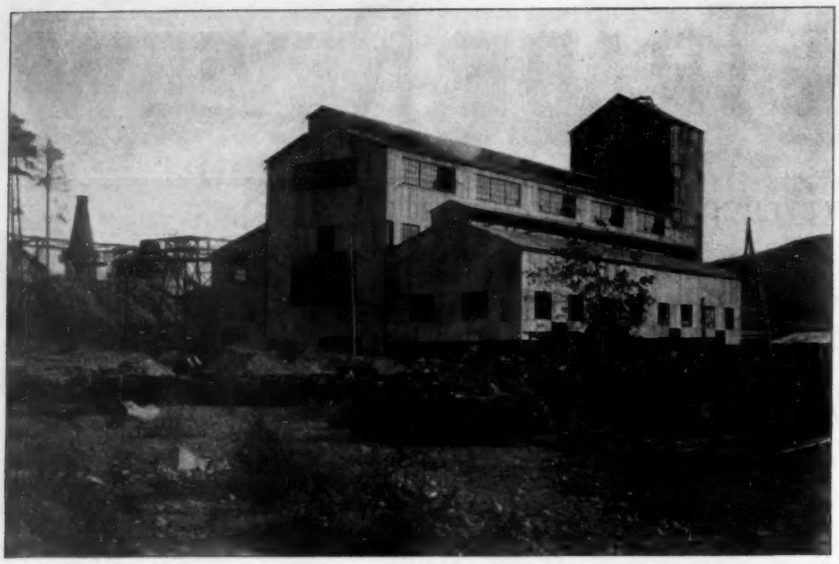


FIG. 2—VIEW SHOWING FURNACE HOUSE AND STOCK YARD

although the time is not far distant when charcoal iron also will be no longer produced in that country.

It was this scarcity of charcoal and the constantly increasing price that led to the experiments with the electric furnaces as it would require considerably less of this fuel if the problem could be solved. The character of the iron could in this way be maintained without a material increase in cost, and the problem in Sweden has been very successfully solved and the furnaces using charcoal as a reducing agent are quite successful.

In Norway, however, charcoal could not be obtained and a solution, therefore, was sought through the substitution of coke for the first named fuel. Until the furnace, which is the subject of this article, was developed, no success had been secured with coke as a reducing agent and it may, therefore, be said that it is the first furnace of its type.

The Tinfos Iron Works were organized as a direct result of the invention and plans for the present works were started in 1910, the inventor and engineer, H. Bie Lorentzen, becoming manager of the plant.

The power is transmitted from the power plants at Tinfos, a distance of about three-quarters of a mile, the line consisting of six copper cables, two for each phase. The poles are of reinforced concrete and have ample capacity for transmitting 20,000 horsepower. The present capacity of the line is about 6,600 horsepower.

As shown in Fig. 8, the furnaces have bottom and top electrodes and one furnace is operated from each

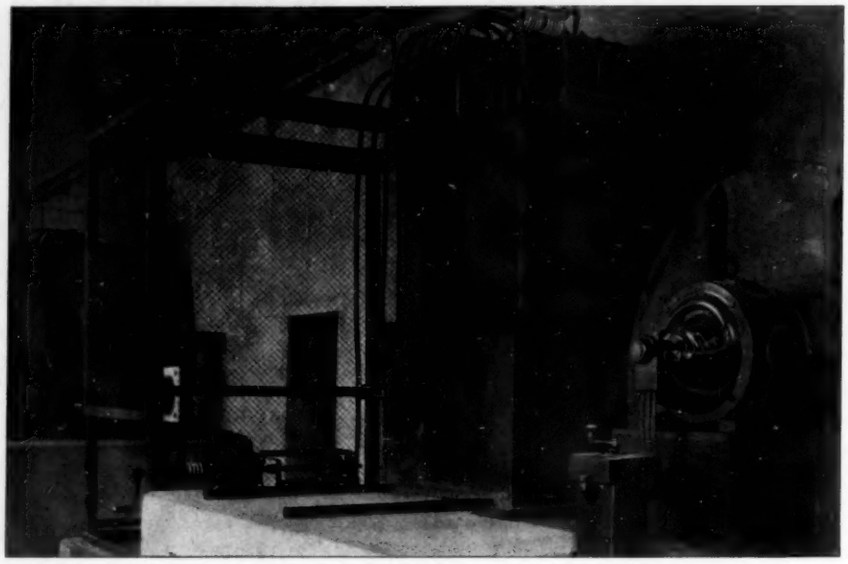


FIG. 4—ONE OF THE TRANSFORMERS

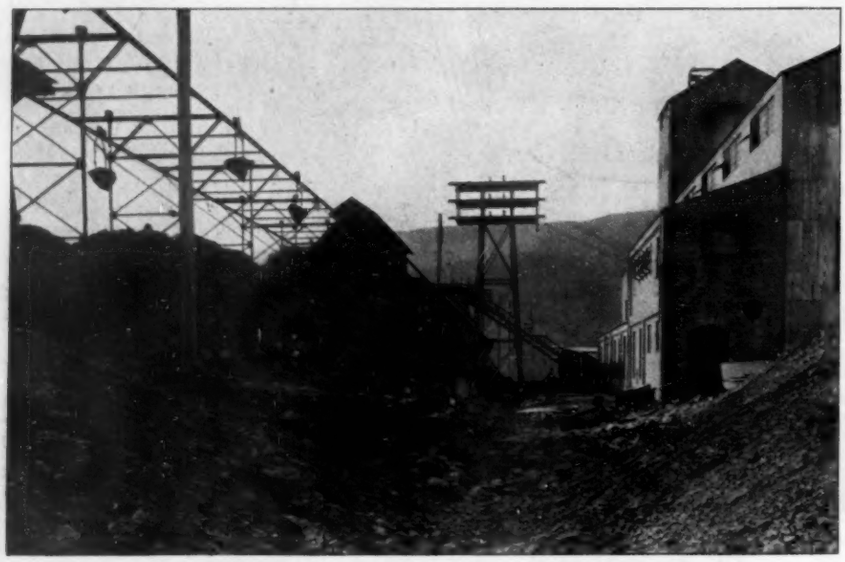


FIG. 3—TRAMWAY FOR CARRYING ORE AND FUEL

phase of the line. Four furnaces have been installed, the extra furnace being used as a stand-by and is cut-in whenever repairs may be required on any of those in operation. There is a transformer for each furnace, these being of the air-cooled type and each is supplied with its own fan for supplying the necessary air. The regulation is on the primary side and is arranged to adjust the voltage of the secondary in steps of 2.5 volts.

The construction of the furnace provides for feeding the ore and coke, which has been previously crushed, into two stacks or channels, one on either side of the top electrode. Thus the charge surrounds this electrode and is replenished as the melted material drops into the hearth. The pressure on the electrode is always uniform and only

sufficient to form the arc, the charge being sufficiently loose to provide the necessary resistance for heating, the design of the furnace being based upon the resistance principle rather than the open arc. The packing of the charge around the electrode prevents the formation of arcs and the charge protects the furnace walls against overheating with its consequent destructive tendency, and the absence of arcs materially lengthens the life of the electrodes. The gases of combustion pass up through the feeding flues and may be led away for further use if desired. In the present furnace, however, the gas is simply allowed to burn at the top, no use being made of it.

The magnetite ore which is being smelted contains an average of 44 per cent iron and is mixed with ordinary, crushed foundry coke. During more than a year of operation the results have been satisfactory. Furnace No. 3 was started on March 1, 1913, and, up to the time of the preparation of this article, a period of nearly eight months, has not been shut down and has run without repairs of any kind. None of the furnaces has ever required relining and all have been tapped regularly every eight hours.

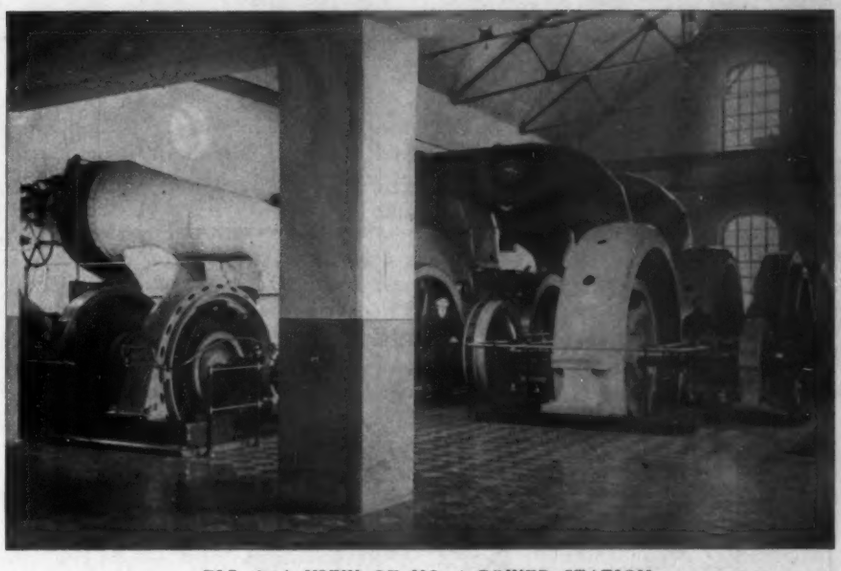


FIG. 6—A VIEW OF NO. 1 POWER STATION

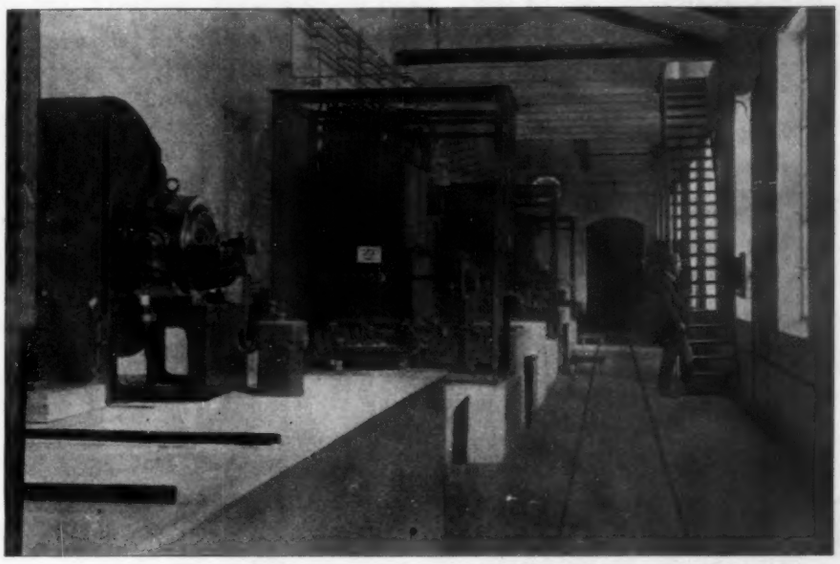


FIG. 5—GENERAL VIEW OF TRANSFORMER ROOM

The arrangement of the bottom and bottom electrode has proven very satisfactory and no difficulties have been encountered in this respect. The furnace lining is of the best quality of fire brick tamped with a covering of dolomite.

The power consumption is uniform and averages about 1,250 kilowatts per phase or furnace. The average output is 10 tons of pig iron per furnace per day with the present ore and this total would be increased with an ore having a higher percentage of iron, the low grade ore having a larger percentage of slag per ton of finished material and this slag consumes considerable power in the process of smelting. The records show that for the past several months the average power consumption per long ton of pig has been between 2,800 and 2,900-kilowatt-hours. These figures are taken from the high tension side of the switchboard and include all of the losses in the transformers and leads as well as losses due to temporary line troubles which have occurred over a considerable period of time. They are, therefore, fairly accurate as to the actual requirements for smelting ore with the low iron content mentioned. The

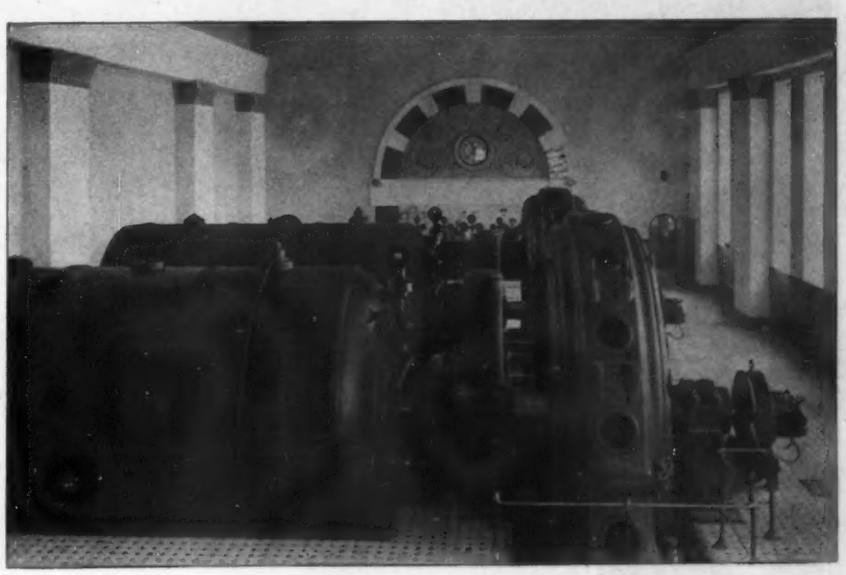


FIG. 7—INTERNAL VIEW OF NO. 2 POWER STATION

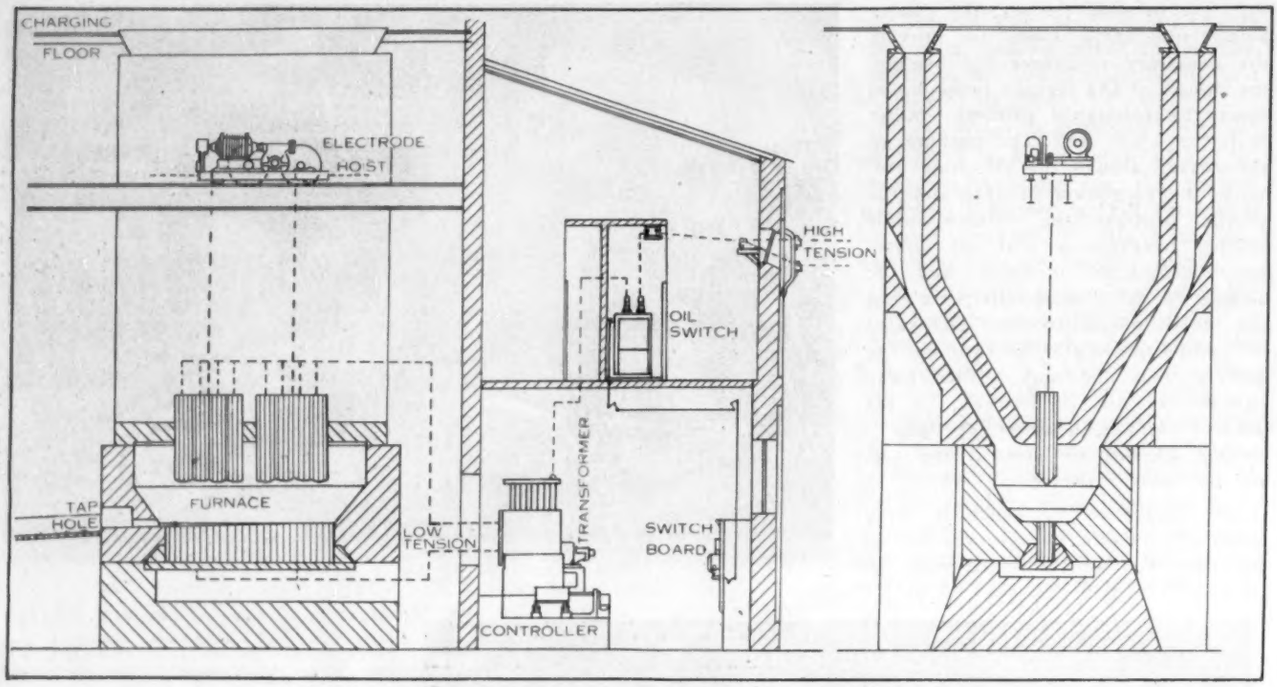


FIG. 8—CROSS-SECTION OF ONE OF THE ELECTRIC FURNACES

electric current costs about 25 kroners (about $8.00) per horsepower year.

A splendid switching arrangement has been worked out by Mr. Lorentzen for changing the work from one furnace to another, such a change requiring but a few minutes.

The pig iron produced is a special low phosphorus quality and the casting is made in iron molds of the shape used in Sweden, being rectangular and flat like the Swedish charcoal pigs. The larger percentage of the product is exported to Germany and England and the price ranges between 75 and 80 kroners ($20.10 to $21.44) per long ton.

The electrodes used in the furnaces are of the amorphous carbon type, square in section, about 12 x 12 inches and 6 feet long. Three of these are built into the top electrode, great care being exercised in this building-up process, which is as follows: The three electrodes are first clamped together with a header which is water-cooled and which has a terminal anchored to a depth of several inches into the top of each electrode. A covering made of dolomite and ground fire brick and asbestos mixed into the form of a paste is then applied to the electrode and covers it for about five feet of its length. This covering is about ½ to ⅝ inch thick and over this a covering of silicate of soda or liquid glass is applied. Over this mass is applied a covering of sheet

FIG. 9—EXTERNAL VIEW OF NO. 2 STATION

iron for about four feet of the length of the carbon. The iron extends under the head clamp so that it is securely held in place. The electrode is then connected to an electric current and is slowly dried until the whole assembly has become a homogeneous mass, and it is then ready for use in the furnace. The construction is quite similar to that which is used in carbide furnaces.

The electrodes are of French or German manufacture and cost about 10 cents per pound. The life of the electrode is about 25 days of 24 hours each, or for 75 tappings aggregating 850 tons of iron.

The raw materials for the operation of the plant are all brought by water, the ore coming from the mines located on the southeast coast of Norway and the coke from England. It is unloaded from boats into buckets which are carried to the various stockpiles by an overhead carrier running on I beams. From these stock piles the material is taken as required, crushed and weighed out in the proper proportions and fed into the furnaces. The flux, which is limestone, is also brought from Skien, located on the Tinn river near its mouth, the latter stream being the waterway by which all materials are brought to the plant.

The remarkable feature of this plant is the fact that it is the first electric smelting furnace which has been successfully operated with coke as a reducing agent and the results obtained has resulted in a second license being granted to the S. D. Capelen Ulefos Iron Works, Ulefos, Norway, where a new plant is now being erected. This second plant will be in operation before Jan. 1, 1914, and it is expected will give even better results than the present plant, as it will have all of the improvements which have been found desirable from the experience obtained at Notodden.

The owners of the Tinfos Iron Works are O. H. Holta, H. C. Hansen, H. H. Tolta, Thv. Schiott and H. A. Hansen. H. Bie Lorentzen, manager of the plant and inventor of the process, is one of the pioneers in the design of electric furnaces for the manufacture of carbide, ferrochrome, etc., in Europe, and has had an experience covering a period from the early developments in the industry.

Combination Jar-Ramming Molding Machine

Owing to the great economy effected in ramming molds by the jarring process numerous combinations of this simple pneumatic machine have been introduced whereby the remaining mold-making operations are performed mechanically and by which rolling-over and drawing the pattern by hand are accomplished by the machine. By the incorporation of these devices in this type of machine, the making of molds is practically automatic and the only labor involved, not mechanically performed, consists of carrying away and closing the mold. An exceedingly simple machine of the jar-ramming type equipped to roll-over the mold and draw the pattern has been designed by the Federal Foundry Supply Co., Cleveland, and is shown in the accompanying illustrations. The roll-over device is so attached that the machine can be converted quickly into one of the plain jarring type, if work is to be made not requiring the roll-over attachment. The machine consists essentially of a jar-ramming cylinder and table for ramming the mold. Two sides of the table, however, are extended and contain the eyes for a bar which is inserted to form a hinge for rolling-over the pattern plate and mold. To the bar are attached two arms, clearly shown in Fig. 5, to which the pattern plate is bolted.

When a mold is to be made, the pattern rests on the table for the jar-ramming machine, as indicated in Fig. 1. After the flask is set in position and filled with sand, the mold is rammed by admitting air to the cylinder, and after the mold has received a sufficient number of blows to pack the sand to the required consistency,

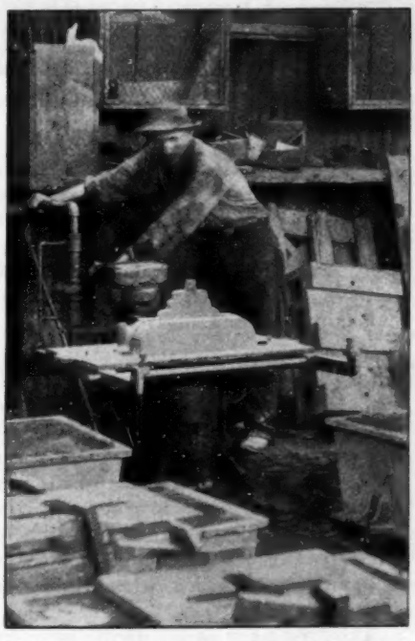


FIG. 1—COMBINATION JAR-RAMMING, ROLL-OVER, PATTERN-DRAWING MACHINE WITH PATTERN ON TABLE

FIG. 2 — FLASK ON TABLE FILLED WITH SAND BEFORE RAMMING

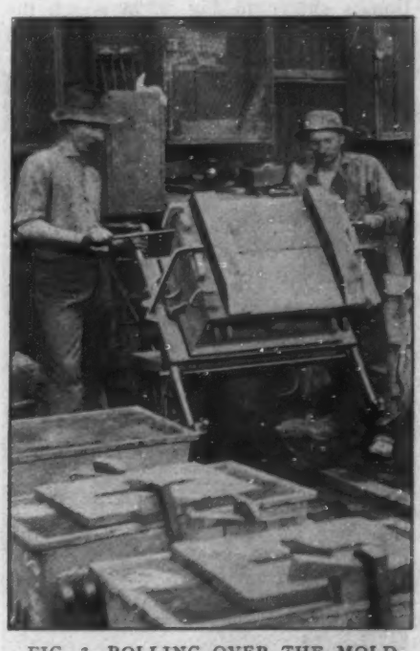


FIG. 3—ROLLING OVER THE MOLD AND LOWERING IT ONTO THE FLOOR TO BE LEVELLED

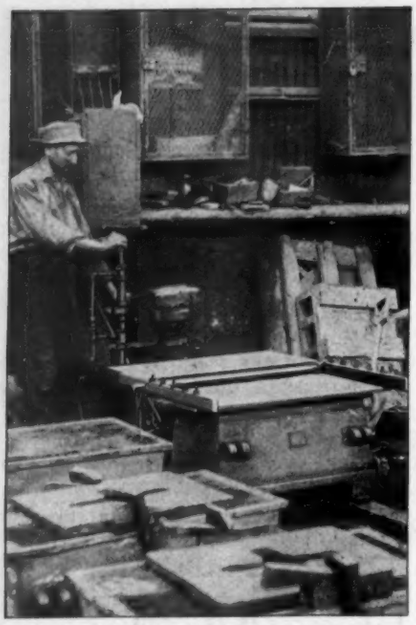


FIG. 4—THE MOLD LEVELLED AND CLAMPS REMOVED PREPARATORY TO DRAWING THE PATTERN MECHANICALLY

the sand is struck-off and the bottom board is clamped in position. In Fig. 2 the operator is about to admit air into the jar-ramming cylinder, and in Fig. 3 the mold is being rolled-over after clamping. In Fig. 4 the mold has been rolled-over and leveled, the clamps removed and the operator is about to admit air into the jar-ramming cylinder to draw the mold. As previously stated, the roll-over device is hinged to the jar-ramming table and by the upward movement of the latter the mold is drawn. This operation is shown in Fig. 5, in which the pattern has been drawn, and it will be noted that the table of the machine likewise has been elevated to effect this draw.

After the pattern has been drawn, the pattern plate is rolled back on its hinge onto the jar-ramming table, which is then lowered and is in position to receive another flask. In the meantime the mold previously made is carried away.

By the removal of a bar inserted through the eyes in the extension of the machine table and corresponding openings in the roll-over arms, the entire roll-over device can be quickly removed. Cores can be made with equal facility, the core box being attached to the roll-over arms in place of the pattern plate. The jar-ramming and pattern-drawing operations are controlled by one lever, obviating the necessity of the operator leaving his station while these movements are performed.

FIG. 5—DRAWING THE PATTERN

Aerial Ropeway for Handling Ore

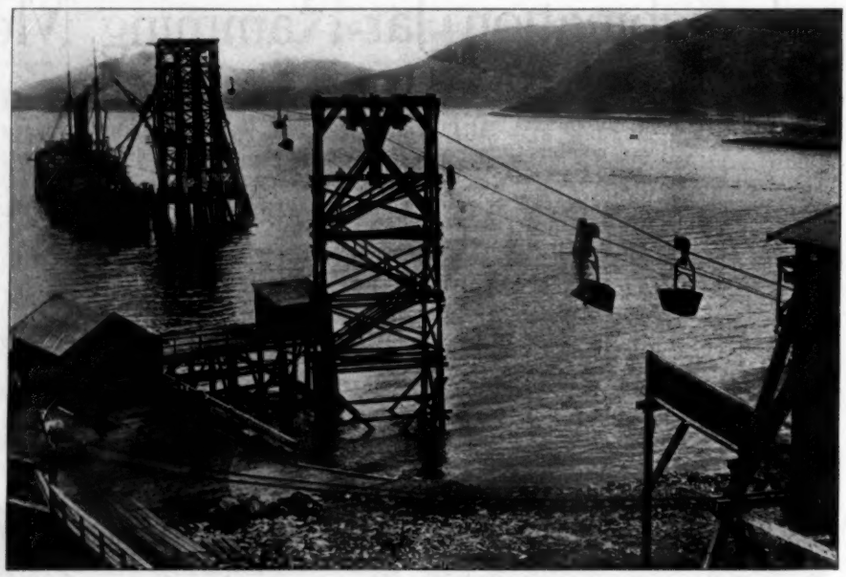
Aerial ropeways, with an aggregate length of almost four-fifths of a mile, are being used successfully by the Westfjord Iron Ore Co., London, England, in carrying ore from its Norwegian mines to the hulls of loading steamers. The ropeways from the mines to the storage magazine have a capacity of 50 tons per hour, while boats can be loaded from storage at an hourly rate of 125 tons.

The mines of the company are located near Bogen on the banks of a bay in the Westfjord, not far from the extensive deposit at Narvik. The ore is mined by the open-pit method and is brought to the terminal, on the bank of the bay, by a wire ropeway, which runs over the crest of a hill to the concentrating plant, about 3,900 feet distance. On this ropeway there are two spans, 1,300 and 1,950 feet long.

The ore is treated at the concentrating plant located near the shore, a wet magnetic process being used and the concentrates stocked in a magazine of 500 tons capacity. A heating plant eliminates any danger of freezing.

The loading station, shown in the accompanying illustration, is built in the sea, about 755 feet from the storage bins. Vessels of 6,000 tons capacity and drawing 28 feet, can moor alongside. The station is erected on a slight rise in the sea bed, which is from 19 to 23 feet below the surface of the water, and slopes off rapidly on the side toward the sea.

In building the station, piles were driven which extended 3 feet 6 inches above water level and the structure erected on these foundations. Piles were driven around the station to prevent large ships, which have difficulty in navigating the narrow channel, from damaging the building itself.



AERIAL ROPEWAY USED FOR TRANSPORTING IRON ORE FROM NORWEGIAN MINES TO THE HULLS OF LOADING STEAMERS

In handling ore, it is first withdrawn from the magazine on longitudinal belts, conveyed to a transverse belt, the latter delivering it to a hopper, from which the ropeway cars are loaded. The cars travel automatically over the entire track, rounding the return sheave at the station where they discharge their contents into the hopper from which the vessel is loaded.

The ropeways used by the Westfjord company were installed by Bleichert's Aerial Transporters, Ltd., London.

Figuring the Power Required for Rolling Metal[1]

A Discussion of the Various Methods for Computing Mill Power Requirements, With a Suggested Simple Formula

By Victor E Edwards[2]

When we consider the vast amount of work, money and ability expended by Dr. Puppe in developing a formula for the power required to roll metal, it is indeed unfortunate that he did not choose a formula that was rational. His formula

$$\frac{(Q_1 - Q_2)\ Lq_1}{\text{work done}} = C$$

is not adapted for covering the ordinary range of single reductions. For figuring a group of passes as necessary when considering continuous mills, it is useless, and this is obvious when one notes that by this formula twice the work required to give a 50 per cent reduction will give 100 per cent reduction.

Twenty-eight years ago the writer was asked to compute the power required to roll billets to rods, and also the power required to draw the same rods to wire. It was first necessary to assume a common unit for comparison. One base only appeared rational, the power required to cause a unit reduction of a unit mass in a unit time. The units the writer first adopted were a unit reduction of 50 per cent, or doubling of the length; a unit mass of one ton; and a time unit of one minute. This gave a formula

$$HP = C\ T\ D$$

where

C = Constant.
T = Tons worked per minute.
D = Doublings or number of times the length has been doubled.

This formula led the author to prepare a table of lengths and *doublings*, corresponding with each successive per cent reduction from 1 to 99 per cent. The last column of this table was, of course, a table of logarithms having 2 for a base. For example:

Per cent.				Doubling.
50	reduct. =	length 2.00	Log 2.00 =	1
75	reduct. =	length 4.00	Log 4.00 =	2
87½	reduct. =	length 8.00	Log 8.00 =	3
25	reduct. =	length 1.33	Log 1.33 =	0.415 etc.

But this was entirely unnecessary labor, as it is well known that logarithms of any base are made by multiplying common logarithms by the reciprocal of the common logarithm of the desired base, or in other words, by a constant. Hence the formula is more available when common logarithms are used, and it becomes

$$HP = C\ T \log E$$

where

$$E = \text{Elongation} = \frac{\text{length after rolling}}{\text{length before rolling}} = \frac{Q_1}{Q_2}$$

This simply changes our unit reduction from 50 to 90 per cent; 90 per cent reduction having an elongation of 10 to 1, and 10 is the base of our common logarithms which are universally available.

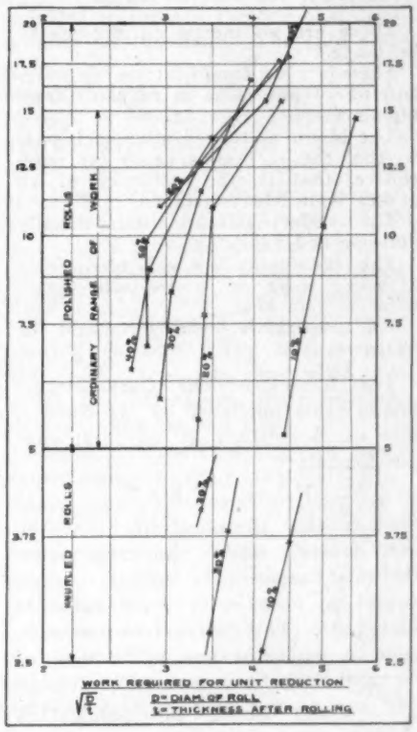


DIAGRAM SHOWING RELATIVE WORK REQUIRED TO ROLL PLATES OF VARYING FINAL THICKNESS AND PERCENTAGE OF REDUCTION

In the above formula, C is a constant when other conditions are constant, but other conditions are seldom constant. It is well known that the blacksmith can elongate a bar most easily on the small end of the horn of his anvil. But what is the formula? Careful and extended dynamometer tests of cold rolling relatively wide strips of commercially pure aluminum, showed clearly that the power required increased somewhat faster than

$$\sqrt{\frac{D}{t}}$$

where

D = Roll diameter.
t = Finished thickness.

This changes our formula to:

$$HP = C\ T \log E \sqrt{\frac{D}{t}}$$

Commercially pure aluminum was chosen because its malleability is perhaps exceeded only by gold and silver, and it does not harden appreciably with continued rolling. Averages of repeated tests plotted on logarithmic cross section paper to the above formula as shown on the accompanying diagram, appear to indicate that the power does increase almost directly as

$$\sqrt{\frac{D}{t}}$$

between the values

$$\sqrt{\frac{D}{t}} = 5 \text{ to } \sqrt{\frac{D}{t}} = 10$$

After passing the latter point the power required increases more rapidly, until for values $\sqrt{\frac{D}{t}} = 15$ the unit power required was 30 to 50 per cent more than called for by the formula. Perhaps part of this was due to the hardening of the aluminum by the continued rolling. But is not much of it due to the increased ratio between the arc of contact and the thickness of the metal? In other words, is it not true that more pressure per unit area is required to compress a very thin sheet of metal between two flat plates than would be required to compress a much thicker sheet? The accompanying diagram also appears to indicate,

1.—That 40 to 60 per cent reductions are most economical in use of power.

2.—That reductions less than 30 per

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[1]Presented before the Engineers' Society of Western Pennsylvania, Pittsburgh.

[2]Vice president, Morgan Construction Co., Worcester, Mass.

cent are extravagant in power consumption, due perhaps to excessive proportion of journal friction.

3.—That rough rolls require much more power than smooth rolls.

Let us assume a concrete example of a pure continuous mill rolling wide flats, taking 50 per cent reduction at each pass. If we assume the roll diameters and temperatures to be constant then each pass would, from the above formula, require

$$\sqrt{2} = 1.41$$

times the power required by the preceding pass.

Temperature

Another factor nearly as important as roll diameter is temperature. Someone has covered this in what appears to be a perfectly logical way by assuming that power varies directly with the tensile strength of the bar being rolled. Adding this makes the formula quite complete:

$$HP = C\ T \log E \sqrt{\frac{D}{t}}\ S$$

Where

S = Tensile strength at the rolling temperature.

This formula clearly shows why a continuous sheet bar mill may require more power to deliver a bar ¼ inch thick than it does to deliver twice the tonnage at the same speed of bar ½ inch thick, and only slightly warmer.

It is interesting and easy to remember that through nearly the entire range of rolling temperatures, a reduction of 400 degrees Fahr. practically doubles the tensile strength and hence the power required to roll.[2]

The formula also shows why the Morgan Construction Co. has always used small rolls and high speeds to conserve temperature and power.

At least one more factor is necessary to make the formula complete—the efficiency of the pass. Obviously, the metal can take the speed of the roll at one point only in the arc of contact. At all other points the metal must slip either against the face of the roll or internally. As an example, it is well known that barrel hoop may deliver fully 10 per cent faster than the surface speed of the roll. This slipping, either external or internal, requires and wastes power. The smoother the roll, the less power wasted. Cold rolling is done in oil and all rolls for cold work are ground as true and smooth as possible. Should not the same reason lead us to grind with much care all rolls for hot work that can be so finished? Less power is required, the rolls last longer and better work is produced. The foregoing all applies to plain, flat passes.

The efficiency of all shaped passes decreases as the slipping increases. This loss of efficiency is especially noted in some of the passes used in rolling rails. But the benefits from using such passes may fully warrant the resulting excess roll wear and power. The accompanying diagram shows that light reductions have a low efficiency. It may not be easy to get a formula that will cover the efficiency of a pass, but it should not be overlooked in computing power requirements.

Dr. Puppe has published a vast amount of reliable data. Motor-driven mills offer reliable data with almost no effort. The Gary billet mill data is excellent for several reasons:

There are no inertia corrections to be made.

There are no complications by overlapping of passes as in regular three-high mills.

The bloom is turned after each pass so that the section is never far from square, that is, the efficiency of all passes is nearly constant.

The reductions are exceptionally uniform and heavy.

The reductions are extended, from a heavy ingot to a 1¾-inch square billet at one heat.

The temperature is fairly constant for all passes.

The figures of the Gary motor-driven mills, published by Mr. Shover, plot out beautifully by our first simple formula:

$$HP = C\ T \log E$$

Such a plot shows clearly that the unit power steadily increases from the first ingot pass to 1¾ inches square by some 6 to 9 per cent for each pass. This increase in power or in C is explained first by increase of $\sqrt{\frac{D}{t}}$, and second, by cooling. A comparison of these figures with those from the adjacent rail mill, clearly emphasizes *pass efficiency* and the difficulties of estimating the power required for complicated passes.

The Canton Foundry & Machine Co., Canton, O., recently has issued a 24-page booklet containing testimonial letters regarding its products received from users throughout the United States and Canada. This company manufactures squaring shears, industrial turntables, portable floor cranes and hoists, etc.

Oxygen Production in the United States

It is reliably estimated that the quantity of oxygen produced in the United States is at the rate of 600,000 cubic feet daily. Of this quantity approximately one-half is supplied by 12 central stations, located in various centers throughout the country and the remainder by plants in individual works. A large number of the central stations are operated by the Linde Air Products Co., and there are several large electrolytic works operated by the International Oxygen Co., Newark, N. J.; the Oxyhydric Co., Milwaukee, and the Dayton Oxygen & Hydrogen Co., Dayton, O. The International Oxygen Co. has installed a large number of plants for individual users and there are numerous oxygen equipments making gas by the Brinn process and by the chlorate of potash method. For welding and cutting, the oxy-hydrogen process is being rapidly developed in this country, both the steel and electric companies making extensive use of this system. The railroads, however, which are such large factors in the use of oxygen in Europe, have not yet adopted this method on any large scale in this country.

The United States government uses considerable oxygen and hydrogen in its different navy yards, but ship builders generally are just beginning to apply the welding and cutting torch in their yards. The range boiler works, tube works and manufacturers of steel barrels, boxes, etc., also are large users of oxygen. It is claimed that there is a scarcity of well-instructed welders, which is due to the fact that the art is still young.

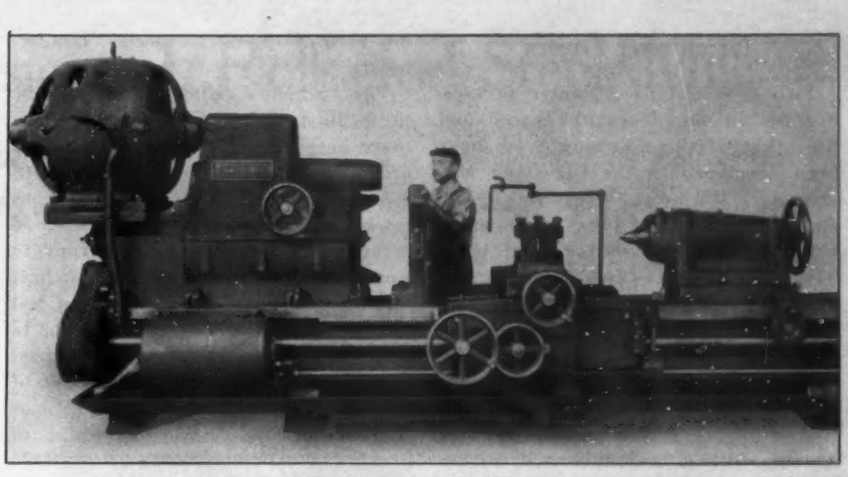
An association recently has been organized among the compressed gas manufacturers, known as the Compressed Gas Manufacturers' Association, with headquarters in New York City. Dr. Hugo Lieber, of the Blaugas Co. of America, is president, and the executive committee consists of J. B. Greiner, Liquid Carbonic Co.; Frank S. Hastings, Standard Carbonic Co.; A. A. Heller, International Oxygen Co.; W. A. Johnston, S. S. White, Dental Mfg. Co.; Otto S. King, Standard Oxygen Co.; J. C. Minor Jr., General Carbonic Co.; A. Cressy Morrison, Linde Air Products Co.; Justin G. Sholes, Ohio Chemical & Mfg. Co.; Dr. E. Sturcks, Crescent Chemical Mfg. Co., and Dr. Hugo Lieber.

The aim of this association is to further the interests of the compressed gas industry in this country, as well as to standardize the methods employed.

[2]Kent p. 440. Kollman's experiments at Oberhausen.

Roughing Lathe for Heavy Forgings

For the heaviest kind of roughing work in turning steel forgings of ordinary lengths, a 30-inch rapid production lathe, shown in the accompanying illustration, has recently been developed. It is built with a 19-foot bed and provided with a 35-horsepower motor, which will deliver to the tool not less than 26,000 pounds pressure at 50 feet per minute.



A ROUGHING LATHE FOR TURNING HEAVY FORGINGS

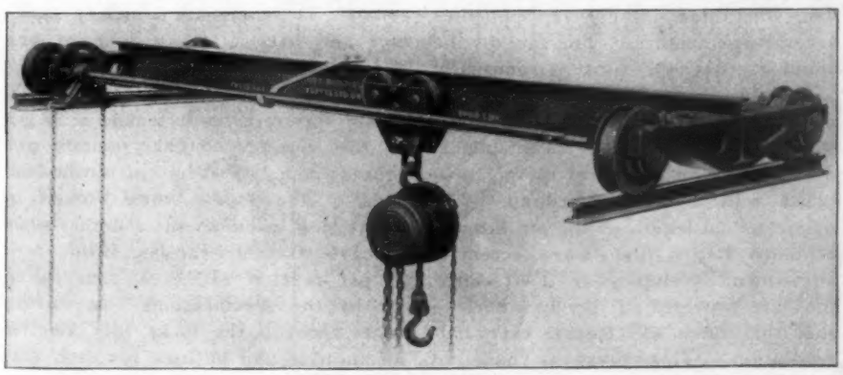
The spindle is driven through gearing by a direct-connected variable speed motor mounted on the headstock. The motor pinion and gear have herringbone teeth for quiet operation. Two mechanical changes of speed can be made in the headstock. The lower speeds of the face plate are obtained by means of a pinion driving the face plate gear. The design eliminates any tendency of the resistance of the tool or of the power applied to the pinion to lift the main spindle in its bearings, and the bearing caps are relieved of the upward thrust due to the cut. The higher speeds are obtained by driving direct through the face plate spindle. The end thrust on the main spindle is taken by large, hardened steel and bronze washers. The gearing in the headstock, in connection with the variable speed motor, gives 40 face plate speeds from 13 to 174 revolutions. By a handle on the carriage, the face plate can be started, stopped, reversed or any of the wide range of motor speeds obtained without requiring the operator to shift his position. The face plate is steel and is provided with radially-adjustable drivers.

All of the rotating shafts in the headstock are mounted in bronze lined, self-oiling bearings with large oil wells. The bearings and gears are entirely enclosed and are furnished with a continuous supply of oil from a tank in the head. This tank is kept filled by a geared pump, drawing oil from a tank in the bed into which all surplus oil drains. The oil is filtered before being used again.

The tool carriage has a bearing on the bed for its entire length. It is gibbed underneath the track, both inside and outside. The edges of the carriage are raised, and drains are provided to prevent the lubricant from running on the floor. The tool slide travels on a wide bridge of such length that the sliding surface on the carriage is not uncovered when turning the largest diameters. The tool carrier has two open side slots and one closed central slot, large enough to receive tools 1¼ x 2½ inches. Each tool slot is provided with a hardened, serrated plate and three clamping screws. The center rest is provided with three adjustable jaws with large wearing surfaces. The bed is very wide and deep, and has wide, flat tracks, tied together at short intervals by heavy box section ties.

Cutting lubricant is supplied by a geared pump at the headstock. Telescopic piping mounted on the back of the bed conducts the lubricant to the tool carriage, from which it returns to a tank at the head end of the lathe.

The tailstock is massive and rigid, but is readily removed by gearing engaging the steel feed rack. It is provided with a graduated set-over for small tapers. Lathes of this type are now being built at the Pond Works of the Niles-Bement-Pond Co., New York.



SINGLE I-BEAM HAND TRAVELING CRANE, EQUIPPED WITH A TROLLEY AND TRIPLEX CHAIN BLOCK

Brownhoist Hand Traveling Crane

A single I-beam hand traveling crane which can be operated in limited head room has been designed by the Brown Hoisting Machinery Co., Cleveland. As shown in the accompanying illustration, the crane consists of a single I-beam supported at each end on a cast steel truck frame. The I-beam is of standard size and the lower flange serves as a track for the trolley with the load. The truck frame is a one-piece steel casting and is designed so to eliminate undue strains upon any member, the load being distributed equally to the two truck wheels. The I-beam rests on two planed surfaces at the center of the track frame, being bolted to the frame at the top and also is held in position by a dowel which fits into a small recess on the under side of the bottom flange of the I-beam. The truck frame is supported on two wheels with bearings on either side. The cranes, of ¼ to 1 ton capacity, inclusive, are fitted with bronze bushings and cranes above one ton capacity are bushed with steel roller bearings. The standard cranes of ¼ to 1 ton capacity, inclusive, with span not exceeding 20 feet have no traveling mechanism, but are easily propelled along the track by pushing or pulling on the load. The larger capacity cranes, however, are equipped with hand chain and sprocket wheel.

The Mesta Machine Co., Pittsburgh, has received an order for a 40-inch condenser from the Northern Iron Co., Standish, N. Y.

New Power Presses

Two new designs of power presses, one of the double crank geared and the other of the punching type, have been developed by the Cleveland Machine & Mfg. Co., Cleveland. The double crank geared press is shown in Fig. 1, and in its construction all parts have been made unusually heavy, the arch and bed being of extra deep section, while the slide is reinforced to eliminate practically all deflection when using large forming or embossing dies. Knock-out rods are attached to the center bearing cap for ejecting formed and drawn parts from the upper die. When desired, the beds of these presses are operated with a drawing attachment which also is used as a knock-out device for ejecting work from the blanking and forming dies. These presses are equipped either with a positive steel clutch or a multiple disc friction clutch, which may be operated either automatically or by hand. The gear and pinion are covered with a cast iron guard to prevent injuries to employes. This type of press is being built in nine sizes with shafts from 3 to 12 inches in diameter. The patterns are so constructed that many dimensions of these presses, such as stroke of slide, distance from bed to slide or die space, opening in bed, etc., can be varied to meet special requirements.

The principal dimensions of the press illustrated in Fig. 1 follow: Distance between uprights, 49 inches; bed area, front to back by right to left, 36 x 48 inches; opening in bed, front to back by right to left, 24 x 38 inches; area of slide flange, front to back by right to left, 26 x 39 inches; stroke of slide, 6 inches; distance bed to slide, stroke and adjustment up, 17 inches; adjustment of slide, 3 inches; ratio of gearing, 7½ to 1; diameter of large gear, 60 inches; weight of balance wheel, 1,400 pounds; weight of press, 28,000 pounds, and capacity, 175 tons.

A new type of punching press built by the Cleveland Machine & Mfg. Co., illustrated in Fig. 2, embodies several new features. The face of the frame across the gibs is unusually wide, permitting V-gibs and a large area on the bottom of the slide for the support of the upper die or punch. The connection is a steel casting provided with a bronze bushing. The diameter and length of the pin bearing is much larger than when eccentric adjustment is employed. Two clutch pins are provided in the fly wheel so that the clutch will engage every half revolution. This press is built in seven sizes, either plain or geared, and is especially adapted for use in the manufacture of hardware, locks, cutlery, typewriters, automobile parts and for trimming drop forgings. The principal dimensions of this machine follow: Bed area, 14 x 20 inches; opening in bed, 9 x 12 inches; distance bed to slide, stroke and adjustment up, 9½ inches; stroke of slide, 1½ inches and weight, 5,000 pounds.

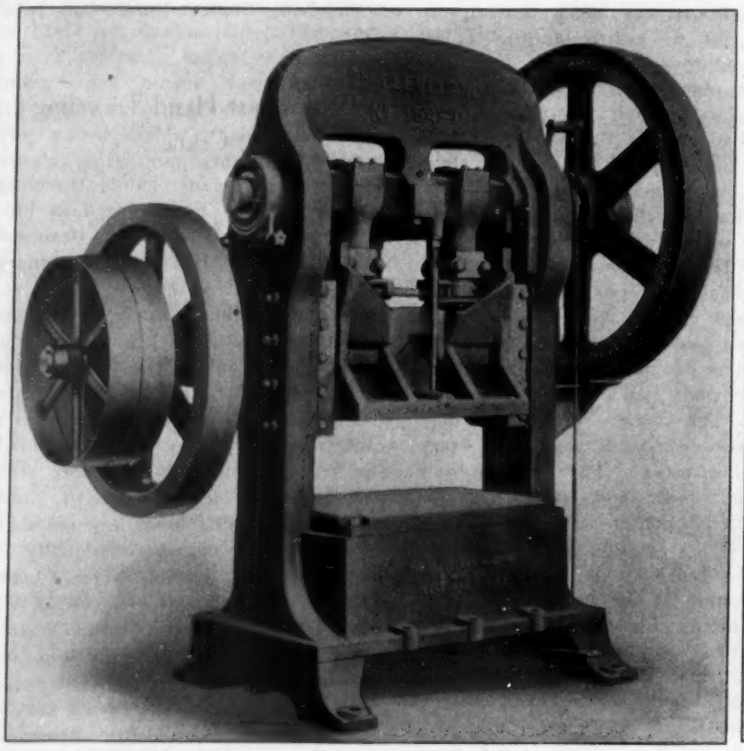


FIG. 1—DOUBLE CRANK GEARED POWER PRESS BUILT BY THE CLEVELAND MACHINE & MFG. CO.

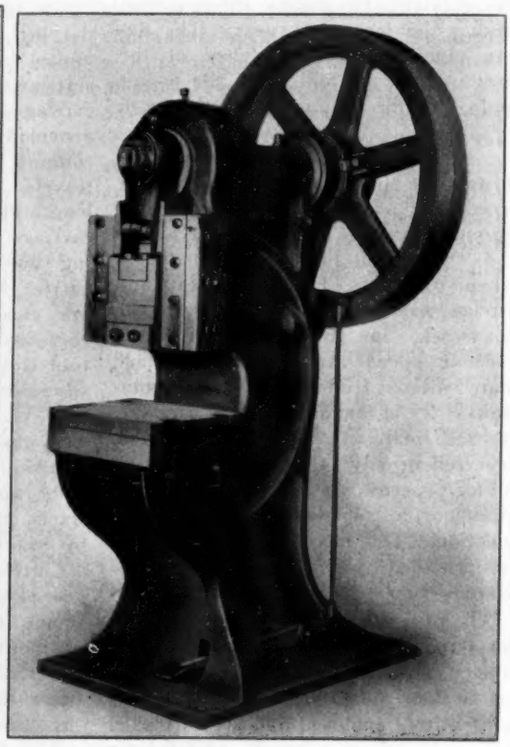


FIG. 2 — POWER PUNCHING PRESS BUILT BY THE CLEVELAND MACHINE & MFG. CO.

Wire Rope for Panama

Tests recently were made of Roebling wire ropes to be used as towing lines at the great locks at Gatun and Miraflores. Forty ropes, each 400 feet long, have so far been made for this purpose. Each has six strands, with 37 wires in each strand, the strands being twisted around a hemp center. The ropes are 1 inch in diameter and have a 4-foot loop at one end. The specifications called for a tensile strength of 37 tons each. To obtain this requires a tensile strength in the wire of 260,000 pounds per square inch. Pieces cut from the ends of the ropes, when broken in the testing machine, showed the ropes to have strengths ranging from 12 to 15 per cent in excess of that called for by the specifications. In towing boats through the locks four electric locomotives will be used for each vessel, two connected by wire ropes to the bow and two to the stern.

Progress in Design of Rolls for Steel Mills---I[1]

Advances Made in the Art of Roll Designing and Turning in Recent Years

The Development of the Rail Section from the Strap to the Present Tee Type

By Thomas H Mathias[2]

It is impossible to take up the consideration of "Progress in Roll Design" without at the same time touching on the improvements in sections, mill construction and appliances, and steel manufacture, as they have gone hand in hand and are mutually dependent one on the other. The measure of this progress can best be appreciated by a comparison of the record of the past with that which is being accomplished at the present day.

The early historians have paid little attention to the roll designer and his work, for he has been slowly developed through a process of evolution. Beginning in the days when he had no personality of his own—when the roller, the machinist, the draftsman, the engineer or the mill superintendent might, for the time being, lay aside his usual vocation and block out a set of passes for the mill rolls and have these turned up from sketches or crude templets in a corner of the machine shop—he has gradually progressed. And as the iron master's business increased from sheet iron, rounds and square and flat bars to rails and other shapes, this corner of the machine shop became a separate department. Eventually, the boss roll turner had an office and, perhaps, a shop for his own use, where he filed out his templets and was in direct charge of all the operations from the necking of the castings to the finished rolls. If he had a little capital he sometimes had a small shop of his own. In any case, his office and shop were carefully guarded. The "No Admittance" sign was conspicuous. The templets — which, as a rule, were the only record of the designs — were handed out one by one to the lathe hand, so that he seldom saw the whole set together. In fact, a large part of the work was done without templets, calipers and a few dimensions given out by the boss being all that the roll turner had to work with on certain sections. The designs, if such there were, and the templets were considered a family inheritance and were handed down from father to son as a legacy of great value. That this was the case was largely due to the fact that practically all of the pioneer roll designer's knowledge of his art had been acquired in the hard school of experience. Engaged in a new art with no precedents to guide him, he groped his way along unknown paths. With his own or his employer's money at stake, every step taken was considered carefully. To a bold or a timid man each design meant more or less uncertainty, until he had acquired the confidence born of experience; and every new section successfully rolled was that much additional knowledge and skill to assist him in the solution of the next problem. His employers, having borne the expense and risk of possible failure of certain experiments in this comparatively unknown field, were loathe to have their competitors secure the benefit of their experience. Consequently, the roll designer hesitated to give information, and in many cases he was commanded to hold his accomplishments as a secret.

This was the roll designer of 20 or 30 years ago. But modern facilities, systems of acquiring knowledge, convenience of travel, and the broadening tendency regarding interchange of ideas and experiences, have wrought a big change. And, as the art is still one not of theory, but of experience, reliable text books on the subject are conspicuous by their absence. But the designer of today has at his command valuable data from the records of the last quarter century. He also is familiar with what his contemporaries are doing. The records of his own designs are complete; the tonnages made on rolls are accurately recorded; trade journals supply him with general plans and descriptions of the new mills and improvements to the older ones. He has a well lighted office and shop, equipped with electrically-driven lathes for turning the heaviest and lightest rolls; roll and tool grinders; surfacing, planing and milling tools; over-head cranes; skilled tool and

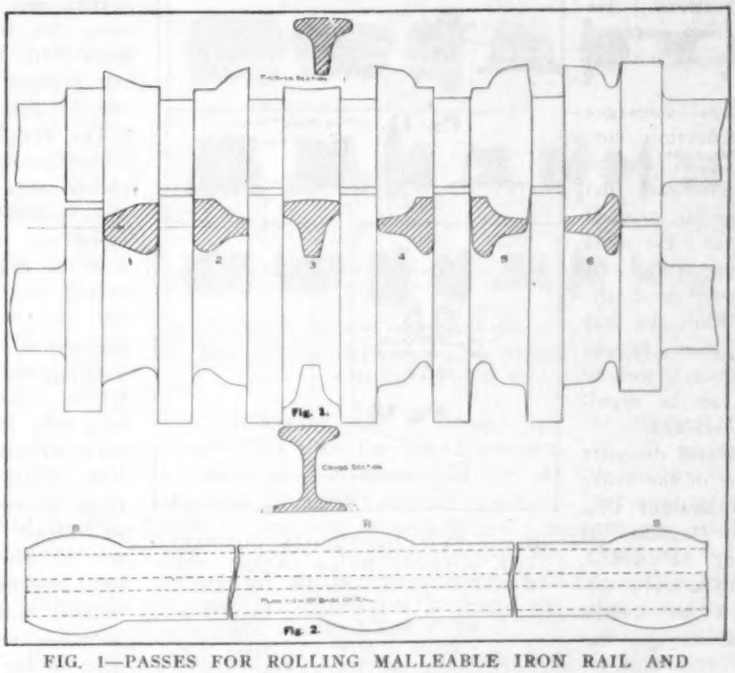
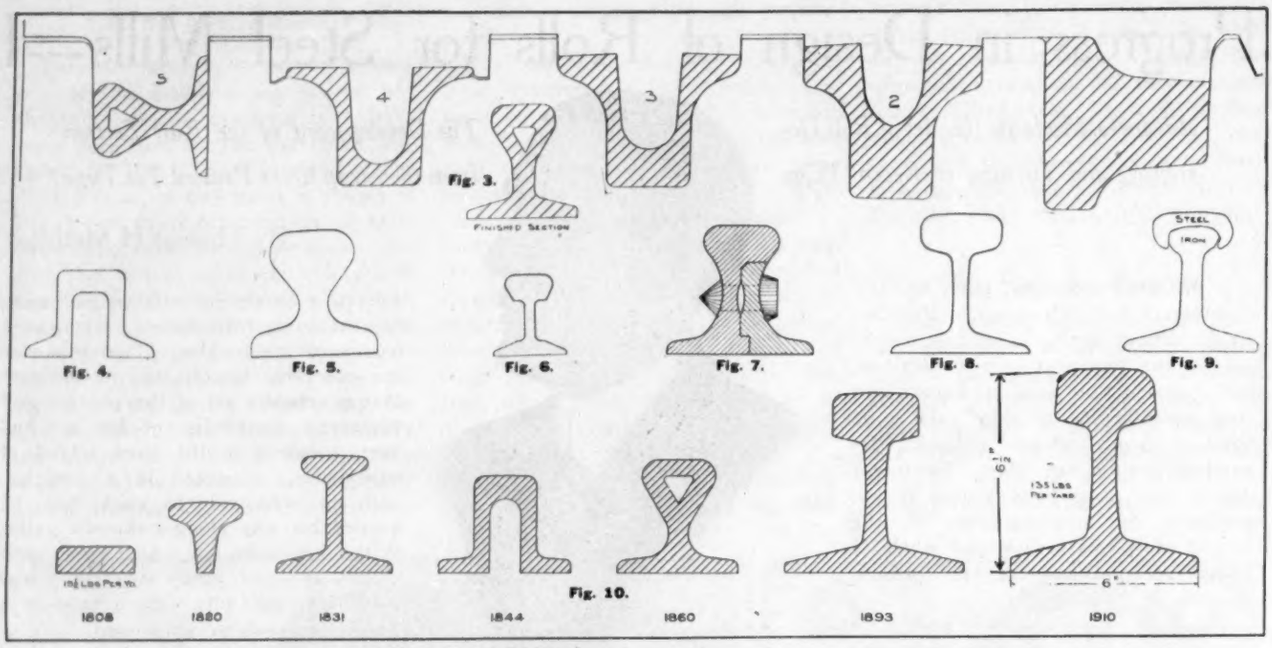


FIG. 1—PASSES FOR ROLLING MALLEABLE IRON RAIL AND FIG. 2 SHOWS THE STEVENS RAIL DESIGNED IN 1831

[1]Presented at the Chicago meeting of the American Iron and Steel Institute.

[2]Assistant general superintendent, Lackawanna Steel Co., Buffalo.



FIGS. 3 TO 10—VARIOUS RAIL SECTIONS IN USE FROM 1808 TO THE PRESENT DAY

templet makers; high-speed tool steels; complete drawings and accurate templets for the shop men and everything that contributes to the higher efficiency. It is a great stride from the little dark corner of the old-time machine shop of a generation ago to the present well-equipped establishment.

Progress Made

But "to whom much is given, of him shall much be required". The roll designer has become the censor of all things rollable. He is required to meet the present day demands for accurate and perfect sections. He must be prepared to design successfully and roll intricate shapes without injury to the material.

The demand for large tonnages requires the greatest reduction during the rolling period, and at the same time he must exercise care that with these heavy drafts no unequal strains occur in the metal. He must have courage to do that which has never been done before, and the skill to do it well. While he has progressed considerably from the old time methods, he has much yet to master before his art can be dignified with the name of a science.

As a general rule, the roll designer has not been an inventor in the sense that he originated new designs that have had in them the elements of troublesome rolling, for he would, naturally, be the first to discern difficulties; but it cannot be denied that he has made progress and has met the demands made upon him.

As early as 1697 rolling mills were referred to as "late improvements in the iron trade". The pages of history for the next hundred years are dotted with patents on rolls couched in language showing the crude conception of the art. For instance, in 1728 a patent was issued to an Englishman for rolls which were to have "A notch or furrow on their surface for forming blooms and bars into various shapes". In 1759 another was granted in England on "rolls for shapes". In 1783 another for "Appliances to be used for squeezing slag out of blooms and for finishing iron into shapes".

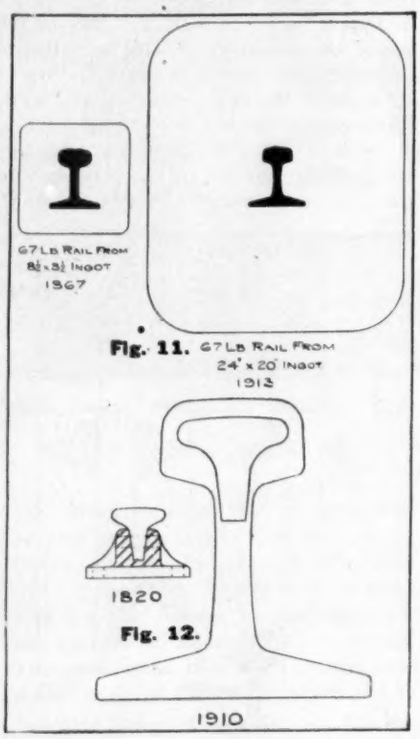


FIG. 11—SIZE OF INGOTS COMPARED FOR ROLLING RAILS IN 1867 AND 1913; A COMPARISON OF THE TEE RAIL MADE IN 1820 WITH THE LARGEST SECTION MADE IN 1910, IS ILLUSTRATED IN FIG. 12

Left Few Records

It appears that sheets, flats, rounds and squares were rolled more or less successfully during the latter part of the 18th century. It was in the early part of the 19th century before the rolling of iron into more complicated shapes was actually begun, and it is from this time that we are able to trace with some degree of certainty the gradual changes and progress of roll designing.

The designs for roll grooves up to within the last 30 years, and in some plants to a still more recent period, were generally laid out on a sheet of metal and the templets cut therefrom, first the finishing pass, then the preceding, and so on back to the bloom.

If the designers of the early days realized the importance of their pioneering, they would undoubtedly have left us more complete records; but, as a rule, history makers are not history writers.

A studied effort seems to have been made to avoid putting these on record, and this makes the matter of obtaining outlines of these old designs almost impossible. It is only within recent years that any accurate records have been obtainable, so far as we are able to learn.

Therefore, with a few exceptions,

we will be able to present only the finished product of the early designing, namely, the outlines of the finished section.

First Types of Rails

Naturally, the pioneers had their attention drawn to that which afterwards became one of the greatest factors in modern civilization and progress, namely, the railroad rail, and their first attempt in this line was rolled flats from 2 to 4½ inches in width, and ½ to 1¼ inches in thickness, and these were known as strap rails. This was about 1808 to 1810.

By 1830 the strap rails passed through many changes of section, some of them resembling a slice off the head of our present tee rail, others approaching the general form of the old street railway stringer rail. The American roll designers and engineers had not as yet awakened to the possibilities ahead, but in England, about 1820, a patent was granted for the rolling of malleable iron rails, the section of which, together with the roll passes as given on the patent office papers, were about as shown in Fig. 1. This rail was probably the original of the type of sections now known as the American tee rail.

In 1830 an improvement was made on this design, and the Clarance rail was rolled. This type, with its modifications, gradually led up to the English bull head rail of 1844 and the larger and improved bull head of more recent years.

First Designs of Tee Rail

But about 1831 an American engineer named Stevens designed a rail which was to do away with the expensive chairs required for the Clarance rail. The head of this rail was similar to the top of the English tee rail but to it was added a base or flanges of varying width, as shown in Fig. 2. The projection, *B*, was to be rolled at intervals of two feet, and was to be the point of support on the tie, but this feature was found impractical, and was abandoned.

The roll designer saw that this was not a rolling proposition and presumably refused to design rolls for it, although these rails, as modified, were afterwards rolled in England, but only after the engineer had put up a money forfeit to cover any possible damage to the mill while rolling them.

Following this, in 1835, there was used on American railroads another type of rail which shows considerable advance in the roll designer's skill. This was the U-rail, of which there were many designs, all of which were made in England up to about 1844, when a 40-pound rail of this type was made at the Mount Savage Iron Works in Maryland. An outline of this rail is shown in Fig. 4.

The pear-headed rail shown in Fig. 5, which followed next in 1845, and of which a large tonnage is said to have been rolled during the several years following, was a simpler section to roll than the U-rail and was accepted as a standard. It was an apparent standing still or marking time of the roll designer's art. In fact, it seems to have reflected the attitude of the railroad engineers, who were apparently satisfied with the rail as rolled.

In 1858 rolls were designed and turned for a pear-headed rail provided with a recess for the top and bottom end of a plain splice of fish bar, as shown in Fig. 6.

A year later a rail was made of the pear type, but rolled similar to the U-type rails and closed-in or welded together at the web, as shown in Fig. 3, which also illustrates the design of passes. These were made at the Cambria Iron Works.

The first compound rail, as shown in Fig. 7, was designed and rolled about 1856. This was the forerunner of different types of two-piece rails, all of which, however, were abandoned, as it was found they would not give service. But this fact has not prevented many inventors, from that time to the present, from endeavoring to produce a two-piece rail that would be serviceable.

During this period, when so many compound rails were rolled, the roll designer undoubtedly acquired valua-

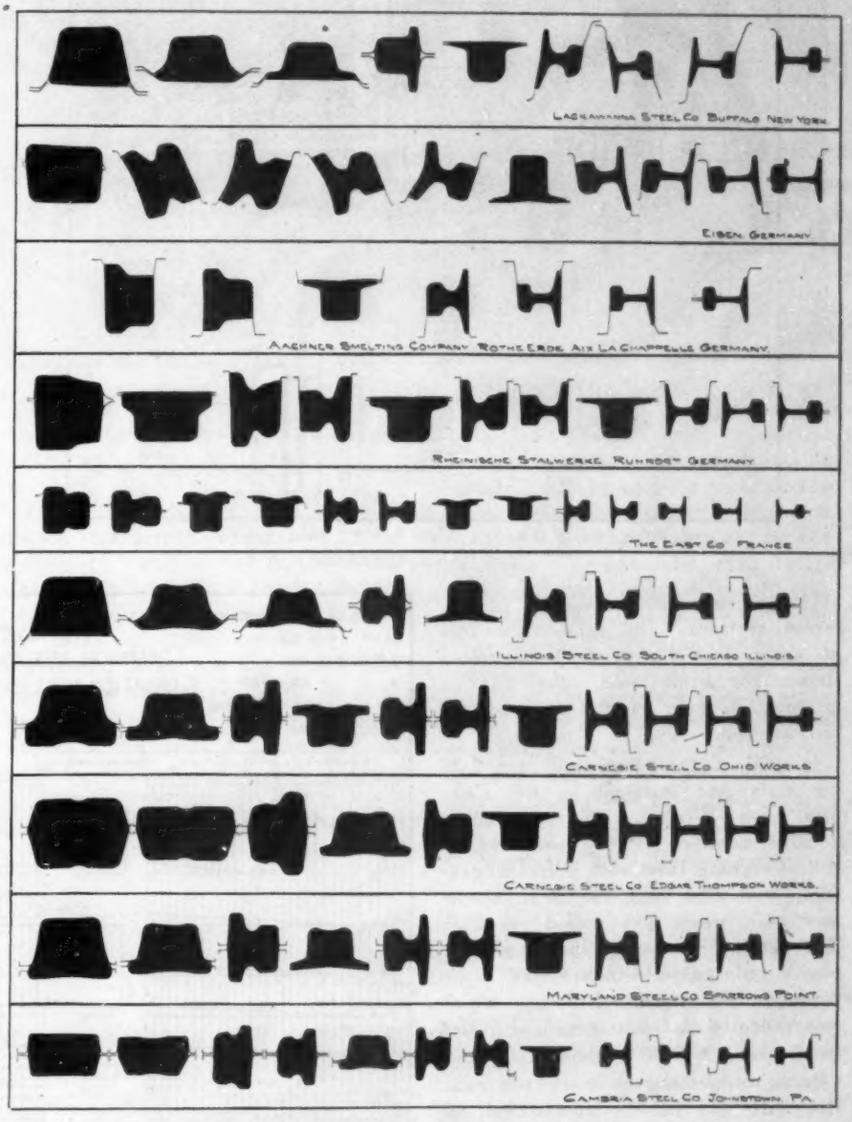

Lackawanna Steel Co Buffalo New York
Eisen Germany
Aachner Smelting Company Rothe Erde Aix La Chappelle Germany
Rheinische Stalwerke Ruhrort Germany
The East Co France
Illinois Steel Co South Chicago Illinois
Carnegie Steel Co Ohio Works
Carnegie Steel Co Edgar Thompson Works
Maryland Steel Co Sparrows Point
Cambria Steel Co Johnstown Pa

FIG. 13—A COMPARISON OF THE DIFFERENT PASSES OF THE VARIOUS AMERICAN AND FOREIGN RAILS MADE TODAY

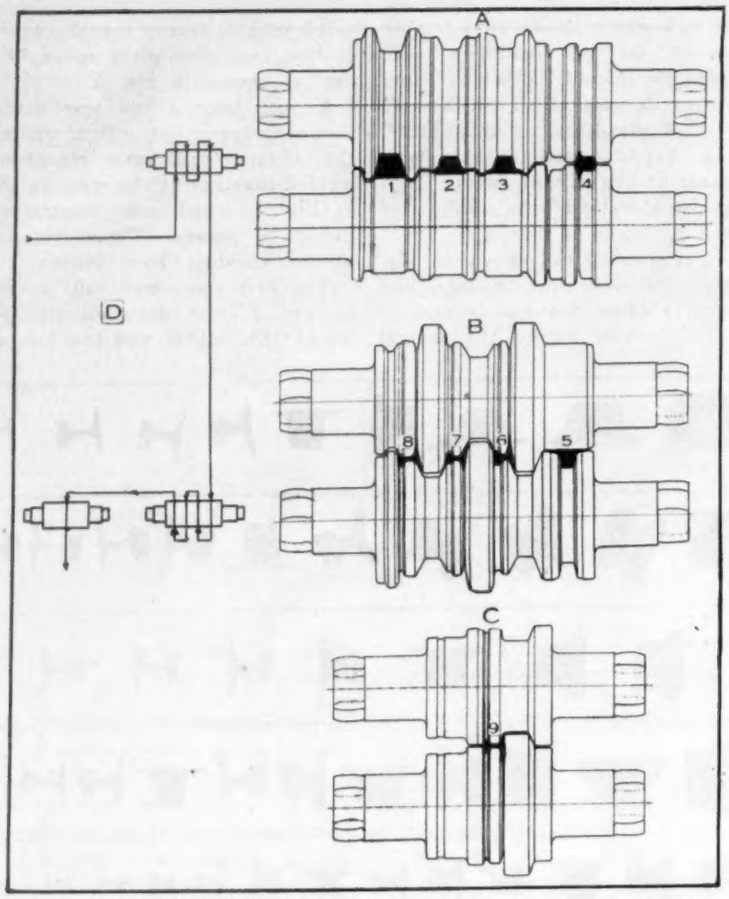


FIG. 14—DESIGN OF PASSES AND ROLLS FOR MANUFACTURING STANDARD TEE RAIL

able experience in the rolling of different sections. But aside from this no great strides were made in rolled shapes for some time, other than a gradual increase in the size of the rail section.

In 1857 a three-high mill for rolling rails was installed at the Cambria Iron Works. This marked a decided advance in the progress of roll designing, and rail mills in general. On this mill the first Bessemer rail order was rolled in 1867. The section was a 4½-inch high, 67-pound rail with a 4-inch flange, made from an 8½ x 8-inch ingot which was reheated and hammered or rolled to a 6½ x 6½-inch bloom.

It is interesting to note the relative size of the ingot and rail as compared with the ingot and rail of today, as shown in Fig. 11.

Thin Flanged Rails

Following this a demand was made for rails with a large percentage of metal in the head and less in the flanges, 50 per cent in the head being recommended. A sketch of this rail is shown in Fig. 8.

The roll designer's hand is again shown by the fact that the railroad manager met with considerable trouble in placing a contract on account of the risk in rolling such thin flanges. This is not surprising when we recall that fresh in their minds were the troubles they had in rolling flanges of any kind on the old two-high iron mills, on which the flanges frequently separated and encircled the rolls or split when a little cold. It may be noted that there are few rails of this size today made with flanges as thin as the then proposed section, though it would not be considered a difficult flange to roll now.

About 1879 a small tonnage of rails was made from a box or pile in which the outside pieces were of iron while the inside was filled with scrap steel turnings, punchings, etc.

Also during this year an iron rail was rolled with a steel head, an outline of this section being shown in Fig. 9.

Rail Improvement

It is of interest to note in 1844 there were about 4,000 miles of railroad track in the United States; in 1870 this had increased to 44,000 miles. From this it is easily seen that successful rolling of the rail contributed a great deal to the rapid development of this country.

From 1867 the tee rail has gradually been improved through the quality of material, larger and faster mills, mill appliance and tables, larger ingots,

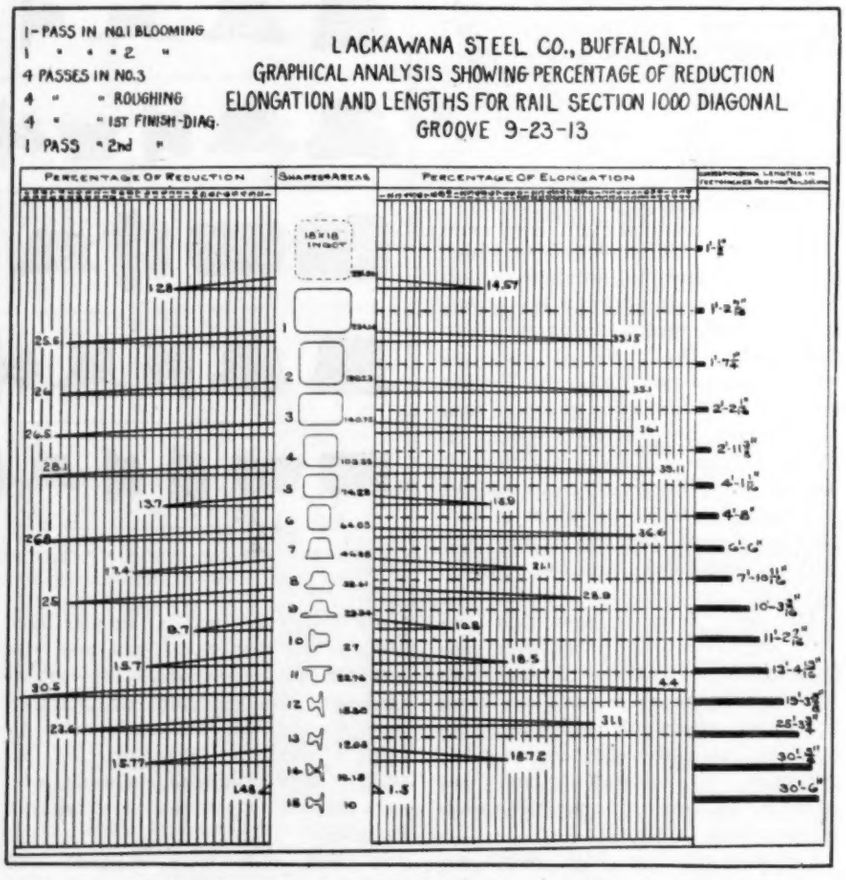

1-PASS IN NO.1 BLOOMING
1 " " 2 "
4 PASSES IN NO.3
4 " " ROUGHING
4 " " 1ST FINISH-DIAG.
1 PASS " 2nd "
LACKAWANA STEEL CO., BUFFALO, N.Y.
GRAPHICAL ANALYSIS SHOWING PERCENTAGE OF REDUCTION
ELONGATION AND LENGTHS FOR RAIL SECTION 1000 DIAGONAL
GROOVE 9-23-13
PERCENTAGE OF REDUCTION
SHAPES & AREAS
PERCENTAGE OF ELONGATION

FIG. 15—GRAPHICAL ILLUSTRATION OF REDUCTION IN AREAS AND CORRESPONDING ELONGATION IN LENGTHS OF BARS

greater and more equivalent drafts, resulting in more regular reductions of metal, less tearing of flanges, and a greater uniformity of section, until at the present time the rail mills of the country are producing rails which pass the most rigid inspection.

A comprehensive idea of the various stages of development of the present-day American rail can be obtained from Fig. 10.

The original tee rail of 1820 compared with the largest rail made in 1910, is illustrated in Fig. 12. This last rail was made at Steelton.

The general design of passes and rolls for the rolling of a standard tee rail from the bloom to finished rail, is shown in Fig. 14. On this illustration, *A*, represents the roughing, *B*, the intermediate and *C* the finishing stands of rolls, while *D* represents a plan view or diagram showing the direction of the bar from pass to pass.

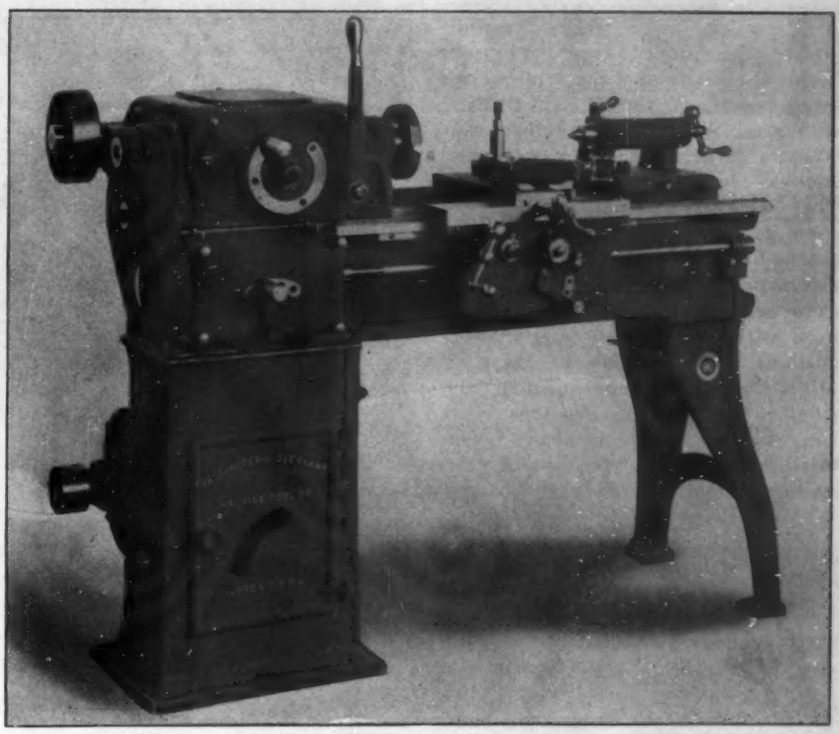
An illustration of the reduction in areas and corresponding elongation in lengths of bars is shown in Fig. 15 and a comparison of the various American and foreign designs for making tee rails at the present time is illustrated in Fig. 13.

Russian Pig Iron Output Shows Gain

The output of pig iron in Russia last year was 4,197,638 metric tons, against 3,593,164 tons in 1911, an increase of 604,474 tons. The 1912 output comprised 3,355,590 tons of steel-making iron, 730,942 tons of foundry iron and 111,106 tons of special iron, all grades showing an increase over 1911.

The output of steel ingots was 4,498,193 tons, an increase of 552,594 tons over 1911. The open-hearth output was 3,649,218 tons; acid converter, 596,854; basic converter, 190,254; crucible, 61,867.

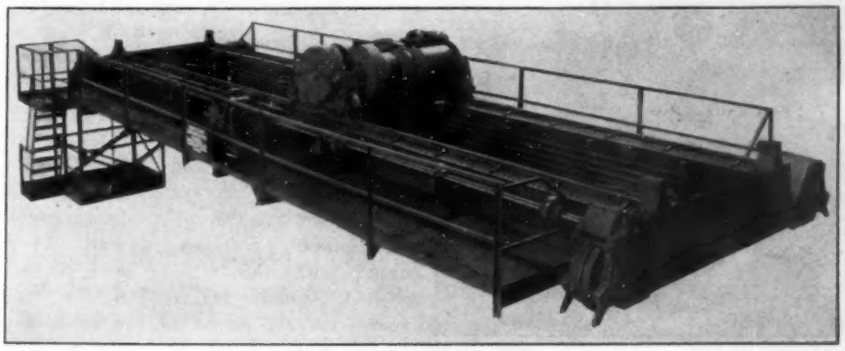
Southern Russia was the leading producer of pig iron, making 67.7 per cent, the Ural district, with 19.7 per cent, being second.



HIGH SPEED, RAPID PRODUCTION LATHE BUILT BY THE CONOVER & OVERKAMP MACHINE & TOOL CO.

A New High-Speed Lathe

To meet the requirements for high spindle speeds, involving also rapid production, the Conover & Overkamp Machine & Tool Co., Dayton, O., designed a new lathe which has a spindle speed of 1,500 revolutions per minute and under test the spindle was operated at 3,500 revolutions per minute. At the latter maximum speed the gears ran quiet and the machine could be stopped, started and reversed through the friction drive in the head. As shown in the accompanying illustration, the machine is of the single-pulley drive, all-geared head type and is arranged for either motor or countershaft drive. It has four all geared mechanical speeds, with the main friction drive in the headstock. Through this friction the lathe can be stopped, started and reversed without impeding the operation of the motor. The splash system of lubrication is employed, felt being used to wipe the bearings, thereby keeping them well lubricated. The vertical lever in the illustration operates the stop, start and reverse and radius plate, with the holes indexed, operates with four changes of speed. The lathe also has four changes of positive geared feed. The apron is of the standard type and the machine also is built for small, high speed chucking work, as well as for regular turning. The lathe shown has a 12-inch swing and a 4½-foot bed.



NORTHERN, 10-TON MILL CRANE

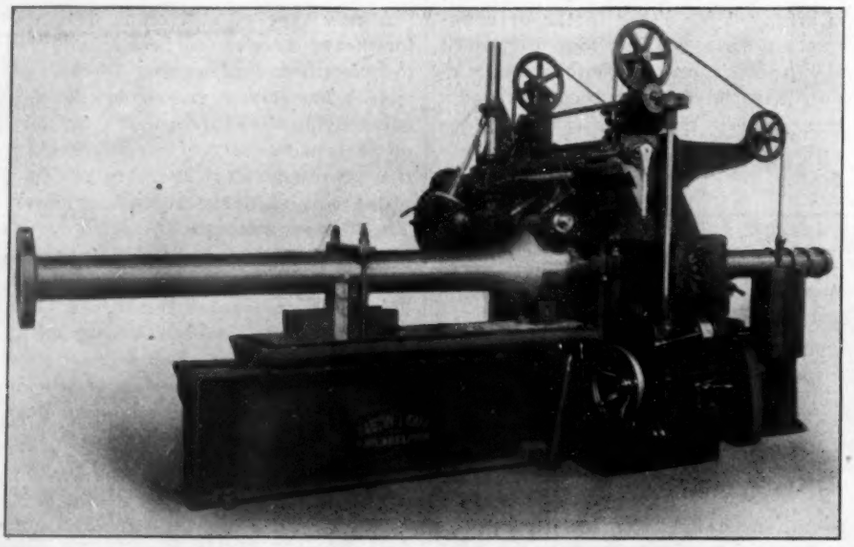
Northern Mill Type Crane

A new type of mill crane designed for heavy service is being built by the Northern Engineering Works, Detroit. The crane shown in the accompanying illustration has a capacity of 10 tons, and is of steel construction throughout. The bridge foot walks consist of checkered floor plates. The bridge end trucks are of steel castings, safety guards being provided in front of all wheels and safety drop lugs underneath the trucks. The trolley, which is especially adapted to heavy mill service, has a cast steel frame and a cast steel separator or girt. The intermediate reduction gear operates in a gear pocket cast into the trolley side, connecting the back geared motor with the drum gear. The crane is equipped with mill motors and the bridge is operated with bar conductors, all wiring being in a

steel conduit. The trolley bearings are of the capped type with split bronze bushings and the trolley axle bearings are of the M. C. B. type with steel waste pockets. The cage is extra large, with an outside steel stairway leading to the foot walk. The crane is without overhanging or open gears and is operated with an automatic limit stop for the hook, automatic electric brakes and a dynamic brake. The crane is built to conform with the standard safety specifications of the Society of Electrical Mill Engineers, supplemented and modified by the specifications of a large steel producing company in the Pittsburgh district, for which this crane was built.

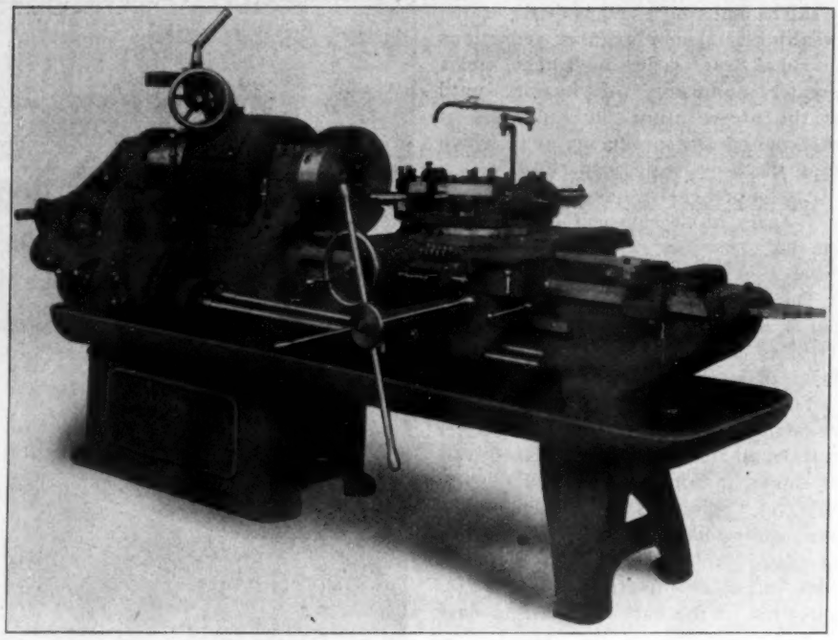
Newton Keyseat Milling Machine

A 30,000-pound keyseat milling machine recently furnished the C. Morgan Smith Co., York, Pa., by the Newton Machine Tool Works, Inc., Philadelphia, is shown in the accompanying illustration. The machine, which is operating on a large shaft, also is used to mill the keyseats in locomotive axles. The full depth, width and length of the keyseats are finished in one operation with the disc cutters and the end mills, the vertical spindle being used only when feathering is required. A depth gage is located on the upright at the right to insure duplicate dimensions in the numerous keyseats made in the same shafts. The horizontal spindle is 5⅞ inches in diameter, being driven by worm and worm wheel, the latter having a bronze ring with teeth of steep lead. The hardened steel driving worm is equipped with roller thrust bearings. The horizontal spindle has a 6-inch cross hand adjustment to facilitate the setting of cutters and the vertical spindle saddle has cross hand adjustment on the rail measured by a micrometer dial through the entire width of the machine. The cross rail is counterweighted and has a reversing fast power vertical movement in addition to hand adjustment. The work table has nine changes of gear feed in both directions and is provided with a reversing fast power traverse, special provision being made for securing and locking the table in any desired position.



LARGE KEYSEAT MACHINE BUILT BY THE NEWTON MACHINE TOOL WORKS, INC.

The Mesta Machine Co., Pittsburgh, has made the final shipment of three 1,000-horsepower gas engines for the Canadian Car & Foundry Co.



A 2¼ x 26-INCH CROSS SLIDE, FLAT TURRET LATHE

Cross Slide, Flat Turret Lathe

A cross slide, flat turret lathe, built by the Modern Machine Tool Co., Cincinnati, is shown in the accompanying illustration. The cross slide has 195 square inches of bearing surface on the carriage and is provided with a full length taper gib to take up wear and a parallel gib on the rear for holding down. The center position is located automatically and positively by a taper locking bolt on the head end of the carriage which may be disengaged when the cross feed is used. The cross slide has 10 stops which stop the slide in either direction and has a travel of 7 inches. The 10 stops may be used for one tool or in any combination for any series of tools. The stops are engaged by a series of plungers located at the front of the carriage, all of which are operated from any location of the slide. The graduations for micrometer adjustment of the cross slide are located on the periphery of the cross feed screw hand wheel.

The cross slide has independent feed in both directions and may be engaged while the machine is in operation. The start, stop and reverse are controlled by a single lever entirely independent of the carriage feed. When the cross feed is operated by hand the screw with two bevel gears are the only moving parts. A 15-inch three-jaw geared scroll chuck with four sets of jaws is furnished. Other features of the machine are the same as the rigid flat turret lathe regularly built by the Modern Machine Tool Co.

IRON AND STEEL MARKETS

Many Mills Are Fighting Further Concessions

And Prefer to Quit Operating Rather Than Make Still Lower Prices—Evidence That Bottom Has Been Reached—Round Tonnage of Basic Bought by St. Louis Company

BY GEORGE SMART

While the production of iron and steel plants is gradually being reduced and some further declines in prices of finished materials have taken place, the downward trend certainly is not so strong in some districts as it has been and many mills are more determined not to quote lower prices. These mills are cancelling some suspended tonnages and are preparing to get in condition to enjoy fully any improvement that may come later. Not much buying is expected this year, but many believe that when buyers become convinced that bottom prices have been struck, there will be a very comfortable volume of new business. Considerable contracting for tin plate was done during the past week by buyers in the New York district, who placed their orders with the American Sheet & Tin Plate Co. Foreign makers of iron and steel products are refusing to contract at low prices now prevailing and are following the policy of American mills in reducing operations for the present. There has been some improvement in prices of certain lines in Germany, but severe depression continues throughout that country and England.

Pig Iron

The only tonnage of pig iron of any considerable size reported was 15,000 tons of basic for the Commonwealth Steel Co., St. Louis, divided equally between two makers in Chicago. Melters generally find that the iron already purchased is ample for present requirements and they are not disposed to purchase for next year. Southern furnaces are apparently holding firmly for $11, Birmingham, for No. 2. The price of English ferro-manganese has been reduced $3 per ton. The price is now $47, seaboard, a decline of $18 during the year.

Shapes and Plates

Structural bookings of the past week amounted to 20,000 tons, of which 12,000 tons went to the American Bridge Co., which has orders enough on hand to keep it busy for three or four months. Some very low prices are being made. On 800 tons of shapes and plates for ore bridges, awarded at Cleveland, a flat quotation of 1.25c, Pittsburgh, did not take the business. The Hobart Estate, San Francisco, has awarded 1,740 tons for an office building to Milliken Bros. The Bloomfield bridge, Pittsburgh, 3,500 tons, went to the Fort Pitt Bridge Works. A bulk freighter ordered for lake traffic will require about 3,000 tons of plates and shapes, and further orders for new boats are expected. A considerable tonnage will be used for repairs.

Railroad Buying

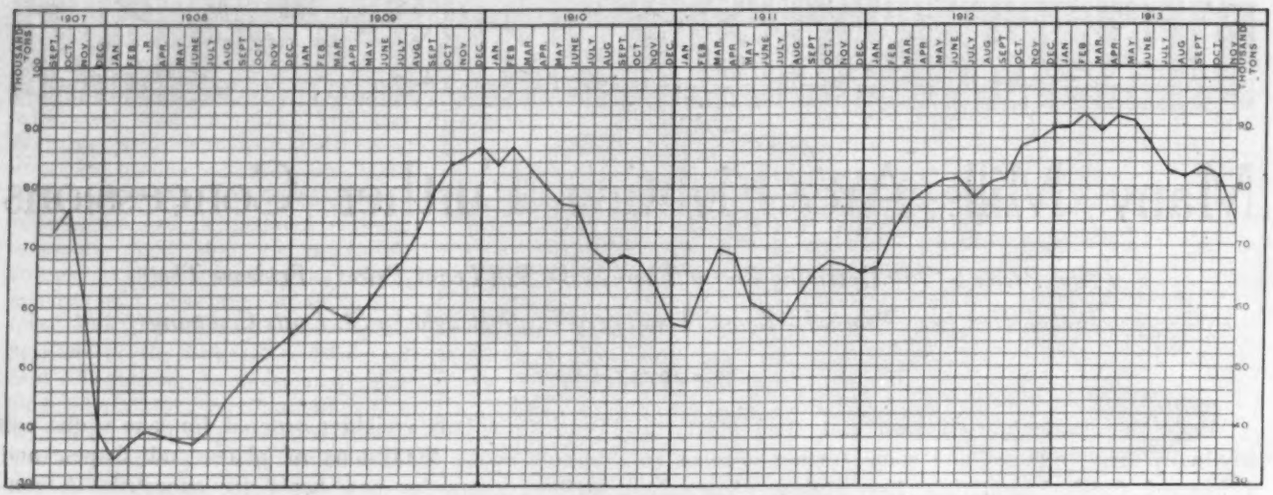
Awards of general contracts for subway and elevated extensions in New York amounted to 37,500 tons. The Chesapeake & Ohio order for 2,000 cars will, it is expected, be placed very shortly. The number of orders for the week included 300 freight cars for the Carolina, Clinchfield & Ohio; 1,600 steel underframes for the Buffalo, Rochester & Pittsburgh; 1,000 steel underframes for the Lehigh Valley, 40 locomotives for the Great Northern, to be built by the Lima Locomotive Works, and 44 locomotives for various railroads, to be built by the Baldwin Locomotive Works. The Southern Pacific has ordered 28,000 tons of open-hearth rails from the Tennessee Coal, Iron & Railroad Co., and is understood to have placed an additional tonnage with another maker.

Pig Iron Production

The slowing down in demand for iron and steel products throughout the country is reflected in the decrease in production of pig iron during the past month, when the output was 2,230,099 tons, a decrease of 309,825 tons, compared with October. The average daily production was 74,337 tons in November, compared with 81,933 tons in October. The loss was largely from steel companies making iron for their own use. The output was the lowest since February, 1912, and a further sharp decline this month seems certain. Reports from steel plants, finishing mills and many other manufacturing concerns indicate continued reduction of working forces. Many plants are working at from 40 to 50 per cent of capacity, and thousands of workingmen are idle.

Iron Ore

The movement of ore from the Lake Superior region by water last month was considerably larger than had been estimated, it being 3,233,468 tons, and making the shipments to Dec. 1 amount to 49,020,836 tons. With the all-rail movement added, the total movement for the year will be nearly 50,000,000 tons.



Average Daily Output of Coke and Anthracite Pig Iron, Sept., 1907-Nov., 1913.

Large Decline Shown in Pig Iron Production

The slackening activities of the country's blast furnaces is shown clearly by the figures just compiled for November production. In total output of coke and anthracite pig iron, there was a decrease from October of 309,825 tons, while the average daily production dropped below 80,000 tons for the first time in 16 months. The total output was the smallest since February, 1912. The number of stacks in blast also shows a large decrease.

The total output in November was 2,230,099 tons, compared with 2,539,924 tons in October, a loss of 309,825 tons. In November a year ago the output was 2,639,562 tons, a difference of 410,000 tons. October of last year marked the beginning of a record-breaking series of months that ended in May with a production of 2,817,000 tons. The average daily output last month showed a decline of 7,596 tons from October, the figures for the two months being 74,337 tons and 81,933 tons, respectively.

The bulk of the decline in November was borne by the steel works or non-merchant furnaces. The production of non-merchant iron in November was 1,565,071 tons and in October 1,843,753, a decline last month of 278,682 tons. In average daily output, the steel works furnaces showed a decrease of 7,307 tons, the average daily production for November and October being 52,169 tons and 59,476 tons, respectively.

The merchant furnaces showed a loss of 34,425 tons in total production, largely due to the shorter month, as their loss in average daily output was only 423 tons, comparing November and October. Merchant iron production in November was 639,273 tons and in October 673,698 tons.

NOVEMBER PIG IRON.

States.	No. of stacks.	No. in blast last day of month. Nov.	Oct.	Total tonnage made. Merchant.	Non-Merchant.	Totals—Nov.	Oct.
Pennsylvania	158	94	100	151,150	819,477	970,627	1,085,454
Ohio	73	51	57	173,491	347,571	521 062	633,722
Alabama	45	21	21	114,324	45,735	160,059	161,365
Virginia	22	8	8	28,314	.....	28,314	22,622
New York	27	12	15	75,917	55,771	131,688	160,020
New Jersey	7	2	2	11,290	.....	11,290	11,236
Illinois	26	15	16	26,848	157,654	184,502	200,436
Colorado	6	1	1				
Indiana	10	7	8				
Maryland	4	2	3				
Wisconsin	6	2	2	12,124	126,032	138,156	180,191
Kentucky	7	1	2				
West Virginia	4	2	2				
Tennessee	18	3	3				
Washington	1	0	0	21,219	12,831	34,050	36,812
Georgia	2	0	0				
Texas	3	0	0				
Minnesota	1	1	1				
Michigan	3	3	3				
Missouri	1	0	0	24,596	.....	24,596	25,593
Spiegel—All states...						10,954	6,159
Ferro—All states....						14,801	16,314
Totals	424	225	244	639,273	1.565,071	2,230,099	2,539,924

MONTHLY PRODUCTION.

	1913.	1912.	1911.
January	2,787,800	2,052,806	1,766,658
February	2,578,670	2,098 796	1,781,285
March	2,762,823	2,411,529	2,165,764
April	2,754,353	2,377,621	2,044,904
May	2,816,825	2 503,341	1,871,388
June	2,616,883	2,433,737	1,773,282
July	2,558,275	2,402,567	1,776,108
August	2,537,018	2,500 163	1,921,832
September	2,494,098	2,444,454	1,973,918
October	2,539,924	2,683,645	2,092,061
November	2,230,099	2 639,562	1,999,100
December	.....	2,777,292	2,032,301
Totals	28,676,768	29,325,513	23,198,601

The average daily output in November was 21,309 tons and October, 21,732.

There was a net loss of 19 in the number of active furnaces. Four merchant furnaces were blown in and six put out, a net loss of two. Seventeen steel works furnaces were blown out, while none was relighted. In all, four stacks were relighted and 23 blown out.

The number of active furnaces on November 30 shows a decline of 81 from the high point of the advance earlier in the year, 306 stacks being in blast on Feb. 28. The decline has been steadily in evidence since that time, 278 being in blast on March 31,

AVERAGE DAILY PRODUCTION.

	1913.	1912.	1911.
January	89,929	66,220	56,989
February	92,095	72,372	63 617
March	89,123	77,791	69,863
April	91,812	79,254	68,163
May	90,865	80,753	60,367
June	87,229	81,125	59,109
July	82,525	77,502	57,294
August	81 839	80,650	61,995
September	83,137	81,482	65,797
October	81,933	86,569	67,486
November	74,337	87,985	66,637
December	.....	89,590	65,558

the drop being due largely to the spring flood; 297 on April 30; 285 on May 31; 283 on June 30; 264 on July 31; 260 on Aug. 31; 258 on Sept. 30, and 244 on Oct. 31. The number of active stacks is the smallest since December, 1911, when 215 were in blast. On Nov. 30, 1912, 289 furnaces were blowing, 64 more than on the corresponding date this year.

The production of ferro in November was 14,801 tons, in October, 16,314 tons, a loss last month of 1,513 tons. Spiegel output was 10,954 tons in November and 6,159 tons in October, a gain of 4,795 tons.

Rules for Panama

Special Commissioner Johnson, of the war department, has formulated rules covering the collection of tolls on the Panama canal.

The same tonnage rules must be applied to all vessels using the canal, and the rules must deal fairly with different types of vessels. The rules have been drawn up with the expectation that they will remain in force permanently, subject only to such amendment from time to time as may be expedient through important changes in the design of vessels or in their propelling power.

The rate of $1.20 per net vessel ton was fixed by President Taft last year, a net ton comprising 100 cubic feet of capacity available for passengers or cargo.

A reduction of 40 per cent is to be allowed ships without passengers or cargo, while war ships other than transports, colliers, hospital ships and supply ships are to pay tolls upon their displacement tonnage—that is, upon their weight instead of their capacity.

A special set of Panama tonnage rules was necessary, because the net tonnage of vessels is determined by different rules in different countries. In doing this, Special Commissioner Johnson consulted authorities in the United States and Europe.

The work was controlled by two general principles. The gross tonnage of a vessel shall include the entire closed capacity and the net tonnage shall accurately express the actual space available for passengers and cargo. The Suez canal tonnage regulations are based on these principles, it is pointed out, and the Panama rules are nearer to those of the Suez canal than to the American, British or other national rules.

J. Geo. Lehman, manager of the Bethlehem Foundry & Machine Co., of South Bethlehem, Pa., left last Saturday on a business trip to Europe.

Round Tonnage of Basic Brought in Chicago

St. Louis, Dec. 3. (By wire.)—The Commonwealth Steel Co. bought last Friday 15,000 tons of basic for delivery over five months, from December to April. Half was purchased from Pickands, Brown & Co., Chicago, and half from the Inland Steel Co.

Obituaries

Buffalo, Dec. 3. (By wire.)—Maurice B. Patch, chairman of the Grade Crossing Commission, Buffalo, and founder and superintendent of the Buffalo Smelting Works, died this morning at 1:45, from a paralytic stroke, at Derby, N. Y., at the home of his son-in-law, William Henry Barr, president of the National Founders' Association. Mr. Patch was born June 8, 1852, at Otisfield, Mass. He graduated as mining engineer from Massachusetts School of Technology in 1872. He was chemist for the Detroit & Lake Superior Copper Co., when he made an exhaustive study of copper metallurgy. He was later superintendent of the Lake Linden, Mich., plant of the Calumet & Hecla Mining Co. He came to Buffalo in 1891, organizing the plant here. The output was nearly 7,000,000 pounds of copper, monthly, employing 250 men.

John F. Lanigan Jr., Lawrence, Mass., died Nov. 21, aged 45. He was treasurer of the Emerson Mfg. Co., agent of the Davis Foundry Co., and part owner of the Lawrence Machine Co. He was also vice president of the Arlington Trust Co., Boston. He was a graduate of the Massachusetts Institute of Technology and a member of many Lawrence and Boston clubs and societies.

Robert Christy Totten, for many years prominently connected with the foundry trade in the Pittsburgh district, died Dec. 1 at his home in Pittsburgh. He was 81 years old. His father, William J. Totten, was one of the pioneer iron manufacturers in Pittsburgh, having organized the Fort Pitt Foundry. When the elder Mr. Totten died, his son entered the concern, and conducted the business until 1891.

David A. Harris, aged 70, for more than 39 years connected with the Cambria Steel Co., Johnstown, Pa., died Dec. 1, in that city. Three years after being graduated from Mt. Union College, he entered the Cambria Iron Co., now the Cambria Steel Co., and for the last 26 years had been head of the time and production departments. A year ago, on his birthday, officials of the company gave a reunion banquet in his honor. Mr. Harris was born near Hollidaysburg, Pa., Oct. 26, 1843.

George B. Post, founder of Geo. B. Post & Son, 101 Park avenue, New York City, an architect, died at his summer home in Bernardsville, N. J., Nov. 28. He would have celebrated his 76th birthday Dec. 15. He was a graduate of the New York University and the recipient of degrees from other universities. He received in 1901 the decoration of Chevalier de la Legion de'Honeur, and in 1910 the gold medal of the American Institute of Architects. At that time, Mr. Post received the personal congratulations of then President Taft. He was a member of a great many technical societies, as well as a member of numerous clubs in New York and elsewhere.

Bankrupt Sale.—The assets of the Beaver Dam Malleable Iron Co., Beaver Dam, Wis., will be sold at bankrupt sale at Milwaukee on Monday, Dec. 8, according to an order issued to Ernest E. Smythe, trustee, by Referee E. Q. Nye. The appraisers have filed their report, giving the value of the three plants in Beaver Dam at $450,000 and book accounts $104,000. Referee Nye ordered the sale in spite of the objections of the bondholders and selected Dec. 10 as the date of the next meeting of the creditors. The company filed a voluntary petition on Sept. 17, giving assets as $600,000 and liabilities as $421,000.

The National Tube Co. will give an exhibition of motion pictures showing the manufacture of modern wrought pipe from the ore to the finished product, at the West Twenty-third street Y. M. C. A. auditorium, New York City, on Thursday, Dec. 4, at 8:30 o'clock. Dr. Wm. Campbell, of Columbia University, will explain the pictures. Prof. Bradley Stoughton will be in charge of the meeting.

Alex. S. Mitchell, 45 Broadway, New York City, has been appointed by the Massillon Rolling Mill Co., Massillon, O., as its sales agent for the Metropolitan district.

Material is being assembled at the Fore River ship yard, Boston, for the frame work of the new telescope for the Mt. Wilson observatory, near Pasadena, Cal.

Prices at Pittsburgh Still Weakening

Output of Blast Furnaces and Steel Plants Being Reduced— Furnaces Continue Buying Coke for Monthly Requirements

BY C. F. WILLIAMS

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg.,
Pittsburgh, Dec. 2.

The beginning of the last month of the year finds the iron and steel trade confronting a situation directly opposite to that prevailing 12 months ago. In some respects, the market today is very similar to that of the latter part of 1911, in that price reductions are the rule, but sentiment is not nearly so cheerful as it was two years ago, despite the fact that present quotations are high compared with those prevailing the closing weeks of 1911. Furthermore, there is not the probability of another remarkable recovery, such as was experienced just before the end of that year. Prices continue to weaken, and the turn is not expected until rock bottom is reached. Pig iron is quiet and uncertain; sheets are more active and also more irregular; shapes and bars are not strong at 1.25c; plates have sold at 1.20c; wire is not above $1.55 for nails, with that figure being shaded in some sections, and other products are so quiet that prices are practically nominal. Mill operations continue to be cut down, and, with prospects for December being less active than the preceding month, it is not believed plants will run at more than 50 per cent of capacity by the holidays. Laborers are being laid off, and many are returning to foreign countries, according to reports from adjacent districts.

Pig Iron.—Pig iron production this month is expected to be very light. Leading steel companies are blowing out stacks every week, and only those merchant furnaces with back log tonnage on their books are in operation. Steel making prices, based on actual sales, continue to decline, as is noted elsewhere in this issue. An eastern consumer wants 200 tons of Bessemer for early shipment, and foundry inquiries involve about 1,000 tons. A local consumer has closed for a fairly large tonnage of gray forge at $13, valley. Clinton furnace is expected to be blown in this month.

Ferro-Alloys.—Dealers say inquiry is exceedingly light and no tonnage of importance is being sold. Prices are unchanged.

Plates and Shapes.—Both plates and shapes are easily obtainable at 1.25c, and a number of mills quote 1.20c on plates. In some quarters, more optimistic feeling prevails, but in others expressions are heard that the market will be quiet the next two months. Consumers are specifying fairly briskly, but refuse to cover future needs.

Sheets. — Specifications are coming out in good volume, and last month was much more satisfactory than many in the trade believed it would be four weeks ago. Prices for prompt delivery, however, are softer. Black sheets have declined to 1.90c and galvanized to 2.90c for No. 28 gage, and No. 10 blue annealed sheets are selling at 1.40c in the east. Operations last week were light, partly because of the holiday.

Rails and Track Material. — Railroads are not buying so heavily as was expected, but mills have enough tonnage on their books to assure operations for five or six weeks. Spikes are quiet, but 1.55c appears to be the minimum of the market. Other track fastenings are nominally quoted.

Billets and Sheet Bars.—Open-hearth sheet bars have sold at a trifle less than $21, mill, and unconfirmed reports are heard of lower prices on billets. We quote rolling billets at $20.50 and sheet bars at $21, maker's mill, this district.

Hoops and Bands.—The market is quiet and prices have not been tested. Hoops are listed at 1.45c to 1.50c and bands from 1.25c to 1.30c.

Iron and Steel Bars.—Steel bars can be obtained at 1.25c for small lots and iron bars are not considered much above 1.40c. Demand is light and mills can make prompt deliveries. Shafting is listed at 62 and 63 per cent off list for carloads.

Muck Bar.—Muck bar is nominally quoted at $30, Pittsburgh. There is practically no demand and no material is being offered.

Bolts, Nuts and Rivets.—Prices again are nominal. Demand is light and makers are more actively soliciting orders, apparently willing to meet the price situation as it presents itself.

Tubular Goods.—Under date of Dec. 1, the National Tube Co. decreased the price of 2-inch line pipe 1 cent a foot, or about $5 a ton, but standard pipe and tubing, casing and drive pipe were not affected. Two-inch line pipe discounts now conform more nearly with standard pipe. Leading manufacturers consider prospects bright for the coming year. Pipe mills continue to receive orders for fairly heavy tonnages.

Tin Plate.—New buying continues fairly heavy, and the prevailing price is being held on the bulk of the tonnage sold.

Wire.—The end of the wire season finds mills with very little tonnage on their books. The market is not above $1.55 for nails, and in some sections of Ohio that figure has been shaded by $1 a ton. The general market, however, is quotable at $1.55. Although jobbers' stocks are low, they do not appear anxious to figure in the market except for immediate needs.

Wire Rods.—The market is quotable at $26, flat, for either Bessemer or open-hearth steel wire rods. An attractive tonnage could be had at less than that figure.

Coke.—Consumers who opened negotiations for next year's requirements several weeks ago, have not yet figured in the market, and it is understood that practically all of these transactions have been dropped. Unless blast furnace managers can obtain fuel at a price in line with pig iron, buying probably will be from month to month. Spot furnace coke is obtainable at $1.75 and a number of furnaces have bought at that figure for shipment the remainder of the year. Contract furnace coke has been offered at $1.80. Foundry grades are quiet, but unchanged. The Connellsville Courier for the week ending Nov. 22, says production was 355,240 tons, an increase of 19,078 tons compared with the week before.

Old Material.—The Pennsylvania railroad will award fairly heavy tonnages of scrap this week, but it is probable the bulk of the tonnage will go direct to consumers, as was the case a month ago. The market is dull, and lower prices are coming out with each new sale. Heavy melting steel is being held at $11.50 by some dealers, but tonnage has been obtained at 25 cents less than that figure. Other grades are somewhat lower this week.

The Detroit Foundrymen's Association has secured A. W. Moyer, of the Quigley Furnace & Foundry Co., New York City, to address the meeting of Dec. 11, on "Core Ovens and Core Oven Equipment," illustrated by stereopticon.

The Snowden Coke Co., Pittsburgh, has increased its capital stock from $5,000 to $292,500.

Slightly Improved Outlook for Pig Iron

In Chicago District—Commonwealth Steel Co. Buys Basic—Lower Prices on Some Finished Materials

BY H. COLE ESTEP

Office of THE IRON TRADE REVIEW,
1521-23 Lytton Bldg.,
Chicago, Dec. 2.

In the gray and spiritless weather, which has enveloped the Chicago district for the past 10 days, the steel market finds its counterpart. General conditions remain practically unchanged. There is a slightly improved tone in the pig iron outlook and manufacturers are obtaining comfort from the fact that steel prices are stationary for the time being. Bars and shapes are now openly quoted 1.43c, Chicago, with plates $1 a ton lower. The decline in sheets has been arrested, temporarily at least, and 3.08c, Chicago, is being quoted for the base size galvanized. So far, there have been comparatively few cancellations. Scrap prices continue to decline.

Pig Iron. — Fairly good sales of basic and foundry iron, coupled with improved inquiry have contributed a few rays of hope to the pig iron situation. The Commonwealth Steel Co., St. Louis, has closed on its inquiry for 5,000 to 6,000 tons of basic to be delivered to its Granite City plant in equal quantities during the next three months. Owing to the quietness with which the transaction was handled, it is impossible to determine the price at which the sale was made, although it is known to be low. There is good evidence that the iron was sold by a steel company in the Chicago district that was a surplus tonnage, owing to curtailed mill operations. The Western Electric Co. has bought 200 tons of 3 per cent southern foundry iron. Pending inquiries for southern iron include one for 600 tons from a Chicago district foundry and two for 300 tons. A Canadian concern is inquiring for 300 tons of malleable. Consumers still have considerable iron to be shipped them on their last half contracts and with a decreasing melt, this tonnage will probably not be cleaned up until well into the first half.

Merchant Bars. — Aside from the fact that the market on steel bars is now admittedly quotable 1.25c, Pittsburgh, equivalent to 1.43c, Chicago, the situation is practically unchanged. Some business is still moving at 1.30c, Pittsburgh. New orders are very light, being less than one-third the capacity of the mills; shipments, however, are going forward at about 60 per cent capacity. Specifications are fair from general sources, but poor from the agricultural implement makers. At least one of the bar iron mills in this territory continues to operate at its full capacity and for the time being iron prices have ceased to drop. Warehouse quotations are unchanged. Concessions are being made on shafting.

Plates and Structurals.—With the exception of an inquiry for 1,000 cars put out by the Grand Trunk, there is very little business under negotiation calling for any notable tonnage of plates and shapes. Miscellaneous orders for tank plates are fair. The downward tendency of the market has apparently been checked for the time being and there are no reports of prices on shapes lower than 1.43c, Chicago, while 1.38c remains the minimum on sheared plates. Nominally universal plates are bringing a slight premium, although a tender of attractive business would undoubtedly result in its being wiped out. Jobbers report a large number of small orders, showing that the shops are piecing out their requirements.

Rails and Track Fastenings.—There is a little better inquiry for track fastenings, but practically no demand for standard rails. Orders for light rails are fairly numerous and this business is of assistance in filling the gaps in the order books. Although the quotations on track fastenings are unsettled, no further declines have occurred except on spikes, which are now selling at 1.60c, Chicago.

Bolts, Nuts and Rivets.—Structural rivets have declined about $1 a ton and may now be quoted 1.85c, Chicago. The Pittsburgh freight differential is not being maintained on this product. With the close of the season for outside work at hand, rivet orders are falling off from natural causes. Specifications for bolts and nuts are light and uncertain.

Sheets.—The Inland Steel Co. is operating 15 of its 18 hot mills, this being equivalent to approximately 83½ per cent capacity. Orders are fairly numerous and are sufficient to maintain rolling schedules on a reasonably satisfactory basis. Mill prices do not seem to be inclined to go under 3.08c, Chicago, for No. 28 galvanized, or 2.08c for the same gage black sheets. The demand for stamping steel is moderate.

Wire Products.—There is no evidence of sales in this territory lower than 1.55c, Pittsburgh, for nails and barbed wire. New business is light, particularly in fencing and agricultural wire; there is a moderately good demand for manufacturers' wire and carload orders are numerous.

Cast Iron Pipe.—Lethargy envelops the cast iron pipe situation and there have been no contracts of note placed recently. Shipments are fairly good and the foundries are operating at about 60 per cent capacity. The recent reductions in prices have had very little effect on the market and the independent producers are quoting very low.

Merchant Pipe and Tubes. — Tube mills have about enough business to last until the end of the year, the bulk of the tonnage coming from automobile manufacturers. Boiler tube orders are light and discounts are uncertain. Sales of the smaller sizes of iron and steel pipe out of stock are moderately good.

Old Material.—Price reductions continue, although the rate of the decline has diminished to some extent. A prominent manufacturer of iron bars refused a tonnage of No. 1 wrought last week at $8.75, Chicago; the same buyer bought cast borings at $4 a net ton. None of the mills are ordering except for their immediate requirements, but fortunately the hand-to-mouth buying has been sufficient to absorb the rather heavy offerings placed recently by the railroads. The new railroad lists now pending include one from the Chicago & North Western, totalling 5,500 tons, on which bids were opened Dec. 2, and another from the Santa Fe aggregating 9,500 tons, closed Dec. 1. The Santa Fe list included 3,000 tons of No. 1 wrought and 1,500 tons of No. 2 wrought. The North Western list included 400 tons of No. 1 wrought and 1,500 tons of re-rolling rails.

The Worcester Pressed Steel Co., Worcester, Mass., has increased its capital from $100,000 to $200,000, and is erecting a steel and concrete building 90 x 150 feet, which will be equipped with new trains for cold rolling, straightening and polishing strip steel. An annealing house 40 x 150 feet is also being erected and a gas producer may be added. The regular equipment for cold drawing, forming and forging steel is being added to. A further building equipped with presses to care for increasing business is planned for next spring.

The Pioneer Iron Works of Tacoma, Wash., has been sold to J. Banford of Tacoma, who will operate it.

More Interest in Finished Material

In the Cleveland Market—Fair Tonnage of Shapes and Plates Involved in Contracts Placed and Pending

BY GEORGE SMART

Office of THE IRON TRADE REVIEW,
Penton Bldg.,
Cleveland, Dec. 2.

Iron Ore.—With one dock still to hear from, ore shipments during November were 3,233,468 tons. This makes the movement to Dec. 1, 49,020,836 tons. About 25,000 tons will be moved during December, so that with all-rail shipments added the total movement for the year will in all probability reach 50,000,000 tons. The November movement is surprising, as no one expected it to be as heavy. Many of the shippers cleaned up early, but the movement during the first 15 days of the month must have been heavier than was estimated. Final cargoes were shipped from Lake Superior on Monday, but a few cargoes will still go forward from Escanaba.

Pig Iron.—Extreme dullness continues and reports are current of very low prices being made for delivery outside of the city. Cleveland foundries, however, still are fairly busy, especially those making the lighter castings, but melters find that the iron which they have bought on contract is ample to meet their requirements and there is no demand for prompt delivery.

Coke.—Several furnace interests along the lakes have covered for their December requirements and are apparently contented to continue the policy of monthly buying. Hence it is not expected that prices will advance. In foundry coke, choice grades are not sold below $3 for either prompt or contract, but some grades can be had at $2.50 to $2.75.

Finished Material. — There has seemed to be a little more life in the finished material market, but some very low prices are being made. An order for a few carloads of plates for delivery in northern Ohio was taken at 1.20c, Pittsburgh, but a number of makers refused to quote less than 1.25c. The structural material market is quiet, but some orders for fair tonnages have been entered in a very quiet way. The steel for the Missouri state capitol, 5,200 tons, has not yet been awarded by John Gill & Sons, general contractors. The Brown Hoisting Machinery Co. has awarded 800 tons of shapes and plates for two ore bridges. A Cleveland convent, 500 tons, was awarded to the McMyler Interstate Co. In semi-finished steel, a Cleveland consumer which is a large consumer of bars has been inquiring for 6,000 tons of billets for delivery during the first six months of next year, but is understood not to be willing to pay more than $20, delivered, Cleveland, and a number of the leading companies have declined to quote. On forging billets, recent quotations are being shaded and a sale for delivery at Akron was made at about $23, Pittsburgh, or $24.40, delivered, Akron.

Some of the leading makers of finished materials are cleaning up their order books by canceling orders which are regarded as dead wood, as they have been under suspension for some time. These mills, believing that better times are ahead, are preparing to get their books in such condition that they will be able to take advantage of any improvement that comes.

The plates and shapes for the new Richardson boat, just ordered, will be placed in a few days by the American Shipbuilding Co. About 3,000 tons will be required. Other orders for boats are extended and a considerable tonnage will be required for repairs.

Old Material.—While large quantities of scrap are being turned out into the market, little buying is being done in the Cleveland district, and no change is manifest in prices. In some districts, tonnages can be obtained at attractive prices and mills are piling some away, but there is said to be little of this sort of buying here. The Otis Steel Co. has bought small lots of heavy steel at $9.50. The Lake Erie Iron Co. obtained some No. 1 busheling around $8; the other two rolling mills in this city are not in the market for this grade at any price. During November and December, contracts for the next year are usually placed; at that time, producers and dealers are anxious to clean up their yards before snow falls, and to prepare for inventory time. This seasonal condition, existing now in an already weak market, has caused the movement of much scrap, and gives rise to the thought that an upturn in prices is not near.

Making Muck Bar.—Some muck bar is being made at the plant of the Youngstown Sheet & Tube Co., four furnaces being in commission. About 15 puddlers from Wilmington, Del., and Reading, Pa., are at work. Sons of Vulcan are not picketing the plant, relying on promises of the local members to remain away. Two muck rollers employed before the strike have charge of the rolls.

FAIR INQUIRY

For Pig Iron in the South—More Buying Confidently Expected.

BY W. B. NEAL

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., Dec. 2.

Pig Iron.—Inquiries for pig iron have been fair with most of the several interests, and numerous with one or two of the larger furnaces, for the week just past. It is confidently expected that renewed activities in the pig iron trade will soon be inaugurated. As furnace yards are almost without tonnage, and production has been curtailed largely and scheduled for further curtailment, and because the stocks of melters are small, a better tone is given to the market and the hope of advanced prices when a renewed buying movement begins is strengthened. The sales for the week aggregate some 9,200 tons. Of this tonnage, 5,000 were entered in two 1,000-ton lots, and the remainder in 250-ton and 500-ton lots for delivery commencing not earlier than March 1, 1914, and 3,700 tons were entered in carload lots and up to 500-ton lots, for first quarter delivery. The prices varied from $11 to $11.50 per ton, for No. 2 foundry, Birmingham. Special analysis iron, amounting to 500 tons, was entered at prices from $12.50 to $13 per ton, according to analysis.

Cast Iron Pipe.—The plants in this line of manufacture are all trying to keep up their force and are using every effort to bridge over the period of lack of orders for continued operations. An order of 500 tons of large size pipe was the largest reported for the week, while smaller orders for various sizes were entered, but the aggregate was considerably below normal.

Old Material. — The old material market is quiet. Heavy cast iron scrap is in good demand and all that is available is taken at prices quoted. Other grades are very slow and only such tonnage as is required for immediate uses is being moved.

Alice furnace at the plant of the Valley Mold & Iron Co., Sharpsville, Pa., is to be improved by additions and changes, which are going forward rapidly.

Southern Furnaces Are Holding Firmly

For $11, Birmingham, for Strictly No. 2 Foundry Pig Iron ---Large Melter Inquiring Quietly—Few Sales Reported

BY S. G. BACKMAN

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg.,
Cincinnati, Dec. 2.

Pig Iron.—There is every reason to believe that no furnaces in either Alabama or Tennessee are openly quoting anything below $11, Birmingham basis, for strictly No. 2 foundry iron for either prompt or first half shipment. It may be possible that a little resale or special furnace iron could be obtained from time to time below this figure for immediate shipment, but it is not known that any sales of this kind have been made for more than a week. Several inquiries for analysis iron have recently been closed at less than $11, Birmingham basis, for both spot and contract deliveries, but investigation has shown in most cases that the iron sold was either too low in silicon or too high in sulphur to be classed as strictly No. 2 foundry. The general furnace quotation, therefore, could be given at $11, Birmingham basis, for delivery over the present month or the first half, but actual selling prices of a limited amount of resale iron and of certain grades of special furnace iron is still a little uncertain. This resale iron, however, if obtainable at all, could probably be had in only one grade.

The southern Ohio market is less uncertain, and the ruling quotation there is $13.50, Ironton, for No. 2 foundry iron, for any delivery from the present time over the first half. Basic iron from this district is probably not as strong in comparison with foundry iron, as it is reported to have been offered recently in large lots below this figure.

A large melter in this territory is inquiring for a good-sized tonnage which would cover several months' requirements, but it is being kept more or less of a secret by both the melter and dealers here. Other inquiries are few and as a general rule for extremely light tonnages. Buyers also are not usually taking the full tonnages stated in their inquiries.

Coke.—The coke market has passed through another very quiet week, but prices have held fairly well in view of the adverse circumstances. Furnaces have begun to feel the market, but are not showing much of an inclination to buy, although they are due to begin contracting for the next year. The Connellsville market is probably the weakest in comparison with the others, as consumption there has fallen off considerably recently, especially on furnace coke, since a number of the larger furnaces have lately been blown out. In the Wise county fields, the shortage of cars is more pronounced than anywhere else, and this, in connection with the fact that production and consumption there are about equal, has caused this district to become slightly stronger than the others. In the Pocahontas and New River fields, most of the coke being produced is already contracted for, this being especially true with furnace coke from the latter. Prices in these two districts are unchanged with the exception of contract Pocahontas furnace coke, which is now given at from $2.15 to $2.60 per ton, ovens. Prompt Wise county foundry coke is now obtainable at from $2.50 to $3.10 per ton, ovens.

Finished Material.—Warehouse business remains unchanged from that of last week, being very quiet and characterized by light sales. Dealers state that buyers are taking much lighter orders than has been their custom for some time, and this is one of the chief reasons why the market has become so dull recently. Judging from the reports given out by most of the warehouses here, business during November fell off about 50 per cent when compared with that of October. Orders at the present time are rather evenly divided among the materials carried in stock here, and more contracts are being received from outside the city than from local buyers. Steel bars are quoted as unchanged at from 1.85c to 2c, iron bars at from 1.80c to 1.90c, and plates and shapes at from 1.95c to 2.10c. All kinds of shafting is given at from 55 to 58 per cent off.

The local sheet mill reports specifications received last week as very satisfactory, and that business in general is unchanged. The mill is running at full capacity, and is now about from two to three weeks behind on deliveries. Prices are unchanged at from 2.15c to 2.20c on black sheets, and from 3.15c to 3.20c on galvanized sheets, both 28 gage and f. o. b. Newport (Ky.) and Cincinnati.

Old Material.—No. 1 machine cast has advanced 50 cents per net ton during the past week owing to a slight demand and to the fact that it is rather scarce at the present time. Stove plate is also holding fairly well at recently advanced quotations, which is likewise due to a slight increase in demand. Dealers state that they are reluctantly disposing of cast borings at $5 per net ton, which is very cheap in comparison with what they should be. The market remains very quiet in regard to the other materials, and prices concerning them are correspondingly weak. Generally speaking, there is still a surplus of scrap in dealers' yards and available throughout this territory that must be disposed of before the market can be made stronger. Transactions, with the exception of No. 1 machine cast and stove plate, appear to be about equally divided among materials carried here, especially those sold in net tons. The heavy materials are not as much in demand as the lighter.

Bessemer Plant Starts

The new Bessemer steel plant of the Pennsylvania Steel Co., at Steelton, Pa., was successfully started on Nov. 28. The plant consists of two 20-ton converters and an 800-ton metal mixer, located in an extension of the open-hearth building, with direct crane connections between the two departments. The construction of the plant was authorized May 1, the Bessemer building and converters, crane equipment, dry house and refractories building having been completed in less than seven months. The new equipment will be used mainly to manufacture the Pennsylvania Steel Co.'s Mayari chrome-nickel steel by the duplex process.

Booklets For Engineers.—Engineers who keep a file of books for reference will be interested to know that the Joseph Dixon Crucible Co., Jersey City, N. J., still has a limited number of booklets dealing with such subjects as "Steam Traps", "Unions for Steam Pipes", "Feeding Graphite for Lubricating Purposes", etc., which will be sent free as long as the supply lasts, to anyone who cares for them. These treatises were prepared by W. H. Wakeman, who has written many articles on practical engineering problems. Numerous illustrations are used to make each subject easily understood.

Plates and Shapes Weaker in East

Cast Iron Pipe Makers Still in Market—Considerable Tonnage of Plates Pending—Offers on Sheets

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
326 Real Estate Trust Bldg.,
Philadelphia, Dec. 2.

A further weakening in the price of plates and shapes characterizes the week in this territory. Demand for pig iron continues at a minimum. The feeling is gaining ground that pig iron prices are now at about the lowest possible level. In the finished materials, plates are enjoying a comparatively good demand.

Pig Iron.—The cast iron pipe interests still continue as large prospective buyers of pig iron, but have not yet closed for any portion of the large tonnages on which they recently asked prices. The Standard Cast Iron Pipe & Foundry Co., it is believed, will close this week for the 6,000 tons which it has had under consideration for a few weeks. This involves southern Nos. 3 and 4 and forge. The Lynchburg Foundry Co., it is believed, will delay for some time closing on the 6,000 tons for which it has been negotiating. This interest is said to have offered to take the tonnage on a basis of $10.75, Birmingham, for No. 2, but this offer was refused. No new business of consequence has come out during the week. Foundries in Philadelphia and vicinity generally are operating at considerably less than their capacity and are willing to buy only such iron as they can use currently. Some 50 and 100-ton lots of eastern Pennsylvania No. 2X have been sold at $15.50, delivered in Philadelphia and vicinity. Small tonnages of Virginia continue to sell on a basis of $13, furnace, for No. 2X. The largest block of Virginia sold last week was 300 tons, which went at this figure. The Crucible Steel Co. of America has withdrawn its inquiry of 3,000 tons of basic, which was intended for delivery at its Harrison, N. J., plant.

A Chester steel foundry, which recently put out an inquiry for 1,000 tons of low phosphorus, is reported to have closed for this iron.

Iron and Steel Bars.—The steel bar market is quite without life and very little business has come out during the week. The usual price is 1.30c, Pittsburgh, but lower than this could be done on tonnage. Common iron bars continue to be sold at 1.25c to 1.35c, delivered in Philadelphia and vicinity. Not enough business is offered to keep the mills busy.

Plates.—This is the most active branch of the finished material market at present. There were sales of small lots last week which aggregated several thousand tons. Inquiries continue comparatively good and business now being figured on appears to be in excess of 15,000 tons, mostly for eastern ship yards. The market again has weakened. While some bookings were made last week on a basis of 1.30c, Pittsburgh, considerable tonnage went at 1.20c, Pittsburgh, equivalent to 1.35c, delivered in Philadelphia or vicinity.

Shapes.—The shape market is quiet and weak. The business that is going is in small tonnages and indications are that no early improvement can be expected. Although some makers claim that the market is 1.30c, Pittsburgh, and that sales are being made at this price, business is being done on the basis of 1.25c, Pittsburgh, and 1.20c, Pittsburgh. At least one small tonnage is known to have been booked at the latter figure, which is equivalent to 1.35c, delivered in Philadelphia and vicinity.

Sheets.—This market at present is a typical buyers' market. A number of consumers during the past week have attempted to make purchases, naming very low prices which they were willing to pay. Little business has resulted, however, as, say the makers, rather than permit the market to weaken further, they would prefer to close down the mills. The sheet market may now be quoted at 1.60c, Philadelphia, or 1.45c, Pittsburgh, for No. 10 gage, blue annealed.

Semi-Finished Material.—Outside of the recent sale of something over 1,000 tons of small billets to the American Horseshoe Co., which was distributed among two or three mills, at prices said to be equivalent to $21, Pittsburgh, there has been little interest shown by consumers. There is no doubt that on tonnage $20.50, Pittsburgh, could be done, but in the absence of business the market cannot be quoted with accuracy.

Old Material.—Not enough old material is moving at present to make a market. Demand on the part of domestic consumers is at the lowest ebb. Dealers, however, are figuring on a considerable volume of foreign business and it would not be surprising if a fair volume of shipments abroad were developed shortly. The chief obstacle at present is the inability of the prospective exporters to obtain what they would consider a favorable freight rate. Steamship companies are asking 16s ($3.84) per ton on heavy melting scrap for transportation to European ports. Another difficulty that presents itself is that borings and other fine scrap must be boxed or packed in barrels for shipment.

SHOW DECLINE

Bessemer and Basic Pig Iron Sell Lower in November.

The average price of Bessemer and basic pig iron in November was $15.125 and $13.013, at valley points, respectively. These averages, announced Monday by W. P. Snyder & Co., Pittsburgh, are based upon sales of 1,000 tons or more. Tonnages involved were light.

In October, Bessemer and basic averaged $15.703 and $13.709, respectively, or $0.578 and $0.696 above the averages established last month. The highest averages in the year were recorded in January, when Bessemer was listed at $17.25 and basic at $16.45. Since the first of the year the former grade has declined $2.145 and the latter has decreased $3.437.

	Bessemer		Basic	
	1913.	1912.	1913.	1912.
Jan.	$17.25	$14.078	$16.45	$12.372
Feb.	17.25	14.00	16.317	12.25
Mar.	17.25	14.0536	16.059	12.76
Apr.	17.008	14.25	15.714	12.981
May	16.78	14.2345	14.899	13.00
June	16.2375	14.25	14.50	13.209
Av. for 1st half	16.9625	14.443	15.654	12.762
July	15.4085	14.25	14.227	13.48
Aug.	15.657	14.534	14.045	14.00
Sep.	15.75	15.962	14.1375	15.134
Oct.	15.703	17.00	13.709	16.184
Nov.	15.125	17.172	13.013	16.192
Dec.	.....	17.2962	.....	16.4486
Average for year	.....	15.090	.....	14.001

In November, 1912, Bessemer averaged $17.172, or $2.047 above the level established last month, and basic averaged $16.192, or $3.179 above the average for the corresponding month this year.

Bessemer has recorded seven declines this year; basic has declined ten times.

Rather than curtail the working force on account of slack work, the Chicago, Milwaukee & St. Paul has placed the blacksmithing and boiler departments of the West Milwaukee locomotive, car and repair shops on the basis of five days a week in place of six days. Saturday has been selected as the day off.

Sluggish Market in New York Territory

Reduction of Melt of Pig Iron—Few Structural Contracts—Price of English Ferro Reduced—Plate and Shape Prices Low

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
503-4 West St. Bldg.,
New York, Dec. 2.

Pig Iron.—Indications point to a considerable reduction in the melt of pig iron generally in this territory during recent weeks. Buyers, consequently, find small necessity for covering against current requirements, and they also, except in a few cases, hesitate to place forward contracts. The result is a continuation of the lifeless and sluggish market that has prevailed for several weeks, and prices still gradually weaken. Buffalo iron can now be done at $13.25, furnace, for No. 2X, which is equivalent to $15, Newark, $15.25, Jersey City, and $15.60, New England rail points. In some cases, eastern Pennsylvania makers are quoting at $15.25, tidewater basis, and in one case on a mixture of No. 2X and No. 2 plain, for a New Jersey buyer, a shade below $15 for these two grades is understood to have been done. A Bayway, N. J., buyer, asking 500 tons of No. 2X, bought the higher silicon iron from an eastern Pennsylvania maker at $15.20, delivered, or $14.50, furnace, and the other grade went to another maker. A Depew, N. Y., manufacturer of railroad equipment has closed for 3,000 to 5,000 tons of malleable for shipment over the first quarter at an extremely low price, it is reported. This order is credited with having gone to a Buffalo seller.

Ferro-Alloys.—Effective today, English makers of ferro-manganese reduced their prices $3 a ton to the basis of $47, seaboard. Some business has already been done at the new price. This reduction followed various rumors of weakness in the market, which have been current the past few days. A Canadian steel interest recently entered the market for 15,000 tons of spiegeleisen and is understood to have placed this business with an English maker, who had the preferential tariff in his favor. The domestic market on spiegel is nominally quoted at $25, tidewater, but this can be shaded. Foreign spiegel now is quoted at $24.25 to $24.50, tidewater. An Ohio consumer asks about 500 tons.

Plates.—As low as 1.20c, Pittsburgh, has recently been done on plates in eastern territory. In these cases, the material usually has been for local delivery and the maker has absorbed some of the Pittsburgh freight. The mill price netted usually has been around 1.25c. Tonnage remains light and some eastern works are reported to be operating only from 40 to 50 per cent of capacity. Some cars are being placed, but these orders are not numerous. Car contracts placed in November totaled less than 2,000. Pending inquiries for cars are estimated at about 8,000.

Structural Material.—New business in structural lines remains very light in the metropolitan district. Where the mills are inclined to quote price concessions, there is little, if any, stimulating effect. The immediate outlook is not very promising, as not a great deal of work is in the active preparatory stage. The usual quotation on shapes is 1.25c, Pittsburgh base, or 1.41c, New York, although this level could be shaded at least $1 a ton on a large tonnage.

Cast Iron Pipe.—Eastern cast iron pipe makers are melting at only about one-half of their normal rate of capacity at the present time. The difficulty of municipalities in floating bond issues is a strong deterrent factor in public lettings and the quiet season for private contracts is at hand. The Standard Cast Iron Pipe & Foundry Co. took the recent order for 600 tons for New London, Conn. About 200 tons for the same city is asked in connection with government pier work. Hartford, Conn., will take bids on 650 tons of 6 to 16-inch pipe on Dec. 11.

Iron and Steel Bars.—It is reported in this district that steel bars have been offered by some makers at 1.25c, Pittsburgh base. These statements, however, yet await full corroboration. The regular quotation of the market is 1.30c, Pittsburgh, or 1.46c, New York, but new business is in such small lots that firmness of this level is not fully assured. Iron bars of common quality are selling at 1.25c to 1.35c, New York.

Old Material. — The market has shrunken to very meager proportions and dealers have increased difficulty to make sales. With a number of eastern steel mills now operating at less than half capacity, there is little demand for steel or other materials from these interests, regardless of the price. In fact, at the present time, the price factor does not seem to be of first importance. On the limited volume of sales being made, prices show continued softness and some further declines in the list are noted. The general situation in scrap in this district at present is the dullest it has been for some months.

STEADY SHRINKAGE

Shown in English Pig Iron Stocks—Furnace Operations Declining.

New York, Dec. 2.—A steady shrinkage still is shown in English pig iron stocks. For the week ended Nov. 20, iron in store in the Middlesbrough district amounted to 151,233 tons, a decrease of 1,139 tons from the preceding week and a decrease of 90,390 from the first of the current year. Stocks in the Cumberland district on Nov. 20 were 10,891 tons, a reduction of 240 tons in the week, and of 25,532 tons during the year to date.

Furnace operations are falling off. The stacks in blast in the Middlesbrough district on Nov. 20 were 79, compared with 81 the preceding week and 89 the corresponding week in 1912. In the Cumberland district, the active furnaces remained at 24, the same as the preceding week, and as compared with 26 on the corresponding date a year ago. In Scotland, there was a loss of one active furnace in the week. The number stood at 78, compared with 79 the preceding week, and with 88 on the corresponding date of last year.

A summary of the stock conditions in the Middlesbrough and Cumberland districts in recent weeks with the number of furnaces blowing shows the following:

MIDDLESBROUGH DISTRICT.

	Stocks.	Furnaces.
Nov. 20	151,233	79
Nov. 13	152,372	81
Nov. 6	156 415	81
Oct. 30	158,281	81
Oct. 23	164,837	81
Oct. 16	167,099	81
Oct. 9	168,474	81
Oct. 2	170,848	81
Sep. 25	171,887	83
Sep. 18	175,803	85
Sep. 11	179,360	88
Sep. 4	183,140	89
Aug. 28	187,269	..
Jan. 1	241,623	..

CUMBERLAND DISTRICT.

	Stocks.	Furnaces.
Nov. 20	10,891	24
Nov. 13	11,131	24
Nov. 6	11,240	24
Oct. 30	12,025	26
Oct. 23	12,889	26
Oct. 16	13,189	26
Oct. 9	13 899	26
Oct. 2	16,968	25
Sep. 25	17,720	25
Sep. 18	18,181	24
Sep. 11	18,829	24
Sep. 4	19,601	24
Aug. 28	19,761	..
Jan. 1	36,423	..

An addition to the plant of the Ulster Iron Works, Dover, Del., is being erected to house the ten puddling furnaces and additional heating furnaces will be placed in the old building.

STEEL FOR ORE BRIDGES

Awarded at Low Price — Structural Contracts Not Numerous.

Steel for two ore bridges, about 800 tons, one for Corrigan, McKinney & Co., and the other for the Algoma Steel Co., at the Canadian Sault, has been awarded by the Brown Hoisting Machinery Co., Cleveland, to a mill in the Pittsburgh district. A bid of 1.25c flat, for plates and bars, failed to get the Pittsburgh business.

The contract for the steel for the capitol building at Jefferson City, Mo., John Gill & Sons, Cleveland, general contractors, involving 5,200 tons, will be let Thursday.

The eastern structural situation shows no increased activity. Awards and inquiries apart from the subway and elevated extensions in New York City, still aggregate but a small tonnage. The present outlook is that there will be little change in the situation for some weeks.

Fabricators in the Pittsburgh district are experiencing an exceedingly dull period. The contract for the Bloomfield bridge, involving 3,500 tons, has been awarded the Fort Pitt Bridge Works. No other contracts of importance were awarded.

With current buying at a low ebb, Chicago fabricators are speculating on the amount of steel that will be required for several large projects that will probably not arrive at the contracting stage for some months. Among these is the new Union station at Chicago, which will require at least 20,000 tons. This project waits only for the favorable action of the Chicago city council, which may be taken this month in spite of considerable opposition. Western fabricating contracts for the past week totaled 2,854 tons; comparatively speaking, this is a very favorable showing.

CONTRACTS AWARDED.

About 1,000 tons of structural steel for the Kanawha bank at Charleston, W. Va., the Potthoff Construction Co., Cincinnati, general contractors, has been awarded to the Bourne-Fuller Co. and the Bethlehem Steel Co.

The McMyler Interstate Co. has taken 400 to 500 tons of steel for a convent at Superior avenue and East Boulevard, Cleveland, John Gill & Sons, Cleveland, general contractors.

Two apartments for the Eighty-sixth street and West End Avenue Co. at Broadway and 150th street, New York City, 1,500 to 2,000 tons, awarded to the Hay Foundry & Iron Works.

Hobart estate, San Francisco, Cal., office building, San Francisco, 1,740 tons to Milliken Bros.

STRUCTURAL CONTRACTS PENDING.

Bids will be received until Dec. 9 by the board of hospital commissioners, Cincinnati, for the structural and ornamental steel and iron to be used in the construction of the new tuberculosis sanitarium in that city, of which several hundred tons will be required. Bids will also be received until this date for the sheet metal and elevator work to be used in this building.

The Finance Co. of Pennsylvania building, Philadelphia, about 1,000 tons, is expected to go to the Cambria Steel Co. or to the American Bridge Co.

Public School building No. 173 at Washington, D. C., 1,000 tons; bids to be taken Dec. 15.

OPEN HEARTH RAILS

Ordered by Southern Pacific — Fair Number of Car Orders.

The Southern Pacific railway has ordered 28,000 tons of open-hearth rails of the Tennessee Coal, Iron & Railroad Co., and is understood to have given some tonnage to another maker. Some other tonnage for this line and other of the Harriman roads is expected to be placed later. Car orders continue to come out in a scattering way. Orders reported this week include 1,600 steel underframes for the Buffalo, Rochester & Pittsburgh, 1,000 steel underframes for the Lehigh Valley and 300 freight cars for the Carolina, Clinchfield & Ohio railway. The Toledo, St. Louis & Western is reported to have closed for 1,000 freight cars. The Baltimore & Ohio railroad has withdrawn its inquiry for 1,000 kegs of standard spikes and inquiries for 2,500 kegs from the Atlantic Coast Line and 1,000 kegs for the Seaboard Air Line, still are pending.

The structural awards for elevated and subway extensions in New York City amounted to 37,500 tons, and the Thos. A. Buckley Contracting Co. was low bidder on the re-advertised letting of 5,500 tons.

Orders for 44 locomotives for several railroads have been received in the past fortnight by the Baldwin Locomotive Works. This is the largest number of locomotive orders received by the Baldwin works since the Pennsylvania railroad some time ago bought 100 engines. One of the orders is for a 35-ton locomotive of the Pacific type for the Santa Fe railroad. The Jamaica government has ordered three Mikados. The Illinois Terminal railroad orders one mogul.

In the west, there has been a slight increase in car inquiries, the principal items now pending being a round lot of freight cars for a steam trunk line and new equipment for the Chicago Elevated Railways Co. There is no locomotive business under negotiation.

CAR AND LOCOMOTIVE ORDERS.

Illinois Terminal Railroad Co. has ordered one locomotive from the Baldwin Locomotive Works and the Atcheson, Topeka & Santa Fe has ordered 35 locomotives from the same builder.

The Great Northern has ordered 40 locomotives, including five equipped with oil burners from the Lima Locomotive Corporation.

The Trona Railway has ordered one oil burning locomotive from the American Locomotive Co. and the Chicago Junction Railway Co. has ordered two switching locomotives from the same builder.

The Missouri Kansas & Texas is reported to have ordered 200 Roger ballast cars.

The Lehigh Valley Railroad has ordered 500 steel underframes from the American Car & Foundry Co. and 500 steel underframes from the Standard Steel Co.

The Buffalo, Rochester & Pittsburgh railway has ordered 1,600 steel underframes from the Pressed Steel Car Co.

The Carolina, Clinchfield & Ohio railroad has awarded 300 stock cars to the Pressed Steel Car Co.

The Toledo, St. Louis & Western railroad is reported to have placed 1,000 box cars with a western builder.

The Alabama, Tennessee & Northern railroad is inquiring for 300 box cars, 125 gondolas and 75 flat cars.

The Chicago Elevated Railway is in the market for 120 coaches.

The Chicago Junction railway has ordered two superheater six-wheel switching locomotives from the American Locomotive Co.

The Great Northern railroad has ordered 40 locomotives from the Lima Locomotive Co.

The Chesapeake & Ohio is in the market for 1,000 box and 1,000 hopper cars.

CAR ORDERS PENDING.

The Grand Trunk System is in the market for 1,000 freight cars.

The Chicago Elevated Railways Co. will purchase 120 all steel passenger cars instead of 100 as first planned.

BRIDGE AND STRUCTURAL WORK.

Section No. 2 of the Seventh avenue subway line, New York City, 6,500 tons; Thos. A. Buckley Contracting Co. low bidder on re-advertised letting.

Section No. 1, Jerome avenue elevated line, New York City, 17,000 tons. General contract awarded to the Oscar Daniels Co.

Section No. 2, White Plains elevated line, New York City, 15,000 tons. General contract awarded to Alfred P. Roth.

Section No. 1A Southern Boulevard elevated and subway line, New York City, 5,500 tons. General contract awarded to Rodgers & Hagerty, Inc.

Superstructure, Bloomfield Bridge, Pittsburgh, 3,500 tons; the Fort Pitt Bridge Works.

Missouri Pacific Railway Co., tonnage for renewals, various locations, 560 tons, to American Bridge Co.

Chicago & Western Indiana R. R. Co., subway and signal bridge, clearing yards, Clearing, Ill., 231 tons to the Morava Construction Co.

Will Reorganize Milliken Bros.

New York, Dec. 3. (By wire.)—The bondholders' committee submitted the only bid for the steel works of Milliken Bros. at bankruptcy sale here yesterday. This is part of the reorganization plan which will be carried forward a few days after the court approves the sale.

A five-story plant, 100 x 350 feet, is to be erected at Jersey City by the Continental Can Co.

Government Would Limit Time for Testimony

Counsel Ask Court of Appeals to Require Corporation to Complete Its Evidence by Dec. 23—Motion Will Be Argued in Philadelphia

Judge Jacob M. Dickinson and Henry E. Colton, of government counsel in the United States Steel Corporation dissolution suit, have filed application that the time during which the counsel for the defense must conclude its hearings be limited to Dec. 23. This application will be argued by opposing counsel before the circuit court of appeals in Philadelphia at 10 o'clock Friday morning. The application will be opposed by the Steel Corporation attorneys, who claim they require considerably more time than this to get in all the evidence they have prepared. Most of the testimony during the past few weeks has concerned conditions of competition in the sale of steel products, and to this end a great many witnesses have been examined. Most of them have been purchasing agents of various concerns which buy steel products manufactured by the Steel Corporation subsidiaries. The government claims that this line of procedure might be continued indefinitely, and hence a time limit has been asked.

It is also possible that time limits will be set by the court on Friday for the entering of evidence by counsel for other defendants in this suit. These are the Great Northern Ore trustees, E. C. Converse, John D. Rockefeller and others, who are represented by three sets of lawyers other than those now conducting the hearings for the defense.

At Tuesday's hearings in the dissolution suit, a manufacturer of wire fencing testified that he buys all of his raw material from the American Steel & Wire Co., despite the fact that that company is a competitor in the sale of wire fencing and that, as a rule, it charges higher prices for wire than other manufacturers of wire. This was Philander L. Carter, of Jackson, Mich., president of the Jackson Fence Co. His company, said Mr. Carter, has been in business since 1905, manufacturing a patented wire fence which sells in competition with similar kinds of fencing made by five or six other manufacturers in this country. Among these is the American Steel & Wire Co. In general, however, said Mr. Carter, the Jackson company's fence brings a higher price than the American fence and other fences. He testified that during all the time his company has been in business, it has been actively solicited by various manufacturers of wire, among these being the Youngstown Sheet & Tube Co., Pittsburgh Steel Co., Cambria Steel Co., Jones & Laughlin Steel Co. and the American Steel & Wire Co. During the years 1909, 1910 and 1911, said Mr. Carter, all these manufacturers averaged $1 a ton lower in price on wire than the American Steel & Wire. Despite this fact, however, the Jackson company has always made its purchases from the steel and wire company. Asked to explain this, Mr. Carter said:

"We have appreciated the American Steel & Wire Co.'s ability to take care of us. The service it has given us has been exceptional. During rush times we have never been forced to shut down a day through lack of material, owing to the fact that they always kept up on deliveries. The quality of their wire is improving year by year."

Mr. Carter testified that the American Steel & Wire Co. has never attempted to establish the price at which the company sold its fences.

Competitive Bids.

Wm. H. Scobie, purchasing agent for the past seven years of the Philips-Carey Mfg. Co., Wyoming, O., a suburb of Cincinnati, said that his company uses about 500 tons of sheets, nails and wire a year. It buys about 2/3 to 3/4 of its nail and wire requirements from the American Steel & Wire Co. These it generally buys on long-time contracts. The company places this business after competitive bids have been received from the various manufacturers. Mr. Scobie testified that there is substantial competition in the steel industry. He also testified that there was active competition in the sale of steel products when he was assistant purchasing agent of the Big Four railroad prior to his connection with the Philips-Carey Mfg. Co.

Wm. O. Rogers, secretary and treasurer of the New York Metallic Bedstead Co., Jersey City, N. J., said that he purchases about 500 tons annually of steel angles, tubes, wire, etc., for his company. All of this buying, he said, has been done on a basis of competitive bidding.

Emanuel Weinlander, of Weinlander & Jackson, also testified that there is active competition in the sale of the steel products which his company uses.

Lambert Hopkins, purchasing agent of the Chicago, Burlington & Quincy railroad, with headquarters at Chicago, said that he directs all purchases which are made by his road. These are all made on a competitive basis. Bids are asked from the various steel manufacturers and contracts then let to the concerns quoting the best terms. He testified that Geo. F. Baker and Norman B. Ream, directors of both the Chicago, Burlington & Quincy and the Steel Corporation, have never interfered in the purchases he made. He described the rail buying policy of his company. The rail requirements, he said, are first discussed by him and H. H. Byram, vice president in charge of operations, specifications, distribution, etc., being considered. The president of the road then authorizes the amount of rails that will be purchased.

Joseph B. Andrews, president of the Andrews Steel Co., and vice president of the Newport Rolling Mill Co., of Newport, Ky., testified that since he became identified with the Andrews company the market for steel billets has been on a sharply competitive basis. He also said since he had been buying pig iron for the Andrews company he has found the same condition existed in the pig iron trade.

"We have found that the market varied," explained Mr. Andrews. "Out of eight or ten people bidding for business, probably two would make the same price."

The witness said the Newport Rolling Mill Co. annually uses about 50,000 tons of sheet bars. He said these are bought on a competitive basis from the mill making the best price, delivery, etc.

"Will you state whether or not during the period since you have become identified with the Newport company, in 1901, that company has operated independently or was it under agreements with competitors as to prices, etc.?" asked Mr. Severance.

"Independently," answered Mr. Andrews.

"At all times?"

"At all times."

"Is there a certain territory in which the mills located as yours are located have a certain advantage over mills in other localities due to freight rates?" was asked.

"There are localities where we have advantages and there are localities where we have disadvantages."

"What is the territory where you have a trade advantage by reason of freight?" asked Mr. Severance.

"In the Cincinnati market and the immediate vicinity thereof to the south and over some of the mills to the southwest; not to the extreme west, however," answered the witness.

Mr. Andrews told that the Andrews company, in 1907, when the present company started business, had a capacity of about 75,000 tons of steel per year. In 1910 one new open-hearth furnace was started and in the last six months two others were built so that the company has a capacity of about 150,000 tons per year. The company markets its products chiefly in Ohio, Kentucky, Indiana and some of its products are sent to the Pacific coast.

Mr. Severance several times turned to the question of "pools" and agreements regarding prices and the witness stated emphatically that from his experience in the last ten years there has always been stiff competition and no agreements made to fix prices.

"Did you ever attend any meetings of steel men subsequent to the so-called "Gary dinners"? the witness was asked.

"I attended several meetings at which some plate and sheet men were present."

"Were these meetings called by Mr. Campbell, of the Youngstown Sheet & Tube Co.?"

"I think at least two of them were," answered the witness.

"Did you make any agreement at any of these meetings regarding prices at which you were to sell your products?"

"No."

"Did you hear of any agreement being made there, or did you hear any other men making agreements of that kind?" asked counsel.

"No."

The cross examination failed to make any change in the testimony of Mr. Andrews. He was followed to the stand by F. O. Schoedinger, of F. O. Schoedinger & Co., of Columbus, O., manufacturers and jobbers of sheet metal ware. He testified as to competition in the trade both in buying steel and selling it.

James Stephenson, of the Cincinnati Iron & Steel Co., Cincinnati, stated his firm did a large jobbing business in structural steel, bar steel and bar iron, and it was also the fiscal selling agents for the Lackawanna Steel Co.

Attorney R. V. Lindabury questioned the witness as to competition in the trade and brought out the fact that the company does annually more than 40,000 tons of business. Of this about 75 per cent is in structural shapes and plates. The witness stated it is the custom of the company's selling men to get business on a sharply competitive basis and low prices are sometimes made if necessary to procure the business. Mr. Stephenson stated his company does business in Ohio, Kentucky, Indiana and the south.

C. L. Greeno, of the C. L. Greeno Co., of Cincinnati, testified the firm is a jobber in sheet metal work and does business on a competitive basis through the southern and central states. His testimony was along the lines of his predecessors.

(Report of hearings last week will be found on page 1035 of this issue.)

Smokeless Furnaces Now a Certainty

By J M Searle

There is no longer any mystery in the abatement of smoke. Tell the district manager of any of the good stoker manufacturers the maximum capacity you will force your boilers to deliver, and tell him you require this without a smoking stack, and he will never fail to produce the desired conditions. All any of the good stoker engineers ask today is a free hand. Such conditions may include the rearrangement, to some extent, of your combustion chamber and chimney draft, but there is no question as to guaranteed smokeless results by the manufacturer.

An instance of labor and fuel saving came to the writer's notice quite recently. An old plant of 55 boilers had become worn out. The insurance company had cut the pressure to 85 pounds; the mill was loaded down with orders. It was concluded, as a last resort, to find a place to locate an up-to-date plant of boilers and double the steam pressure. Eight 600-horsepower units of the water-tube type, fitted with good mechanical stokers, were installed. These eight new boilers are saving in payroll $1,500 per month, and in coal $3,500 per month, which is $60,000 per annum, or 6 per cent on $1,000,000. But they have done much more than this; they have increased the capacity of the entire mill, thus creating an additional source of revenue, and they occupy but 4,500 square feet of ground, whereas the 55 boilers, which were thrown out, occupied 45,000 square feet, which turns loose 40,500 square feet of most valuable ground for purposes of mill enlargement.

Rushing the Boiler

It so happened that an evaporative test was being conducted upon one of these 600-horsepower units the day the writer last visited this plant, and an average capacity of 948-horsepower had been developed for about six hours. The eight individual stacks were absolutely smokeless and the products of combustion had averaged for this six-hour period 12½ per cent of CO_2 gas; and yet it is frequently heard among men who call themselves steam engineers that we cannot rush a boiler and maintain a smokeless stack. This plant cost complete $130,000, including steel boiler house, main steam piping, feed pumps, feed-water heaters, ash and coal-handling devices, the latter being for both river and rail shipments.

In designing a furnace, one must not forget that no one type of device or appliance will suit all conditions. The smoke problem does not take more kindly to a universal "cure-all" than does the human system. On the contrary, each case of smoke abatement must receive individual treatment, or failure will result.

When the stoker salesman approaches the manager he is frequently met with the statement that the coal bill is, relatively speaking, a small item. If he knows his job he will immediately begin to convince such a manager that the dollar saved by the fireman has just exactly the same value as the dollar saved by the purchasing agent, and that the treasurer likes it just as well. Managers in the writer's home city of Pittsburgh are

[1]From paper read before Pittsburgh Foundrymen's Association.

[2]President International Association for the Prevention of Smoke, and chief of the division of smoke inspection, Pittsburgh.

now being importuned not to make expensive alterations to their power plants, because large central stations, distant several miles from this city, are nearing completion, which will supply power cheaper than we can ever hope to produce it in our small local plants. It is, therefore, up to us at this moment to give them a run for their money, and in doing this we cannot longer neglect the coal pile. Neither must we ever permit ourselves to believe that the small power plant cannot produce as cheaply as the large plant. The central station makes power to sell and the small plant makes it for home consumption. We must now commence to hunt for leaks, because bookkeeping in the power plant is forcing economies. Then, too, the general tendency of the price of coal for many years has been upward. We must expect this tendency to continue, because there is less coal in the field today than there was yesterday, and more furnaces each succeeding day to consume it. We must, therefore, in view of all these things, attack the fuel problem.

Smokeless Plants

If we expect to produce high furnace efficiency and smokeless plants we also need some reliable form of CO_2 recorder in our boiler or furnace rooms; also our pyrometer and differential draft-gage must constantly point to results. Then, too, in boiler practice, the arrangement and relative position of the absorbing surfaces has much to do with plant efficiency. Also the nature of the load carried must be considered when selecting machine-firing devices.

Engineers have spent much thought and much money on compounding high-class reciprocating engines, and in designing many types of steam turbines, in order to grab the last unit of energy from the steam they have generated, but in far too many instances they have simply closed their eyes to the appalling waste of energy that is constantly sneaking dividends out of our stacks.

It is still considered quite the proper thing by many of our plant engineers to refer all ills in the boiler house to an evaporative test that records the amount of coal used and water evaporated in a given time, but without any reference to gas analysis. When such a test has been completed, the engineer gathers up his memoranda and proceeds to figure out, as he says, the efficiency of his plant, without a scrap of data as to the composition of his products of combustion. Does he get much information of value from such a test? Not very much. He has commenced at the wrong end of his job. He should have first gone on a hunt for his percentage of CO_2 (carbon dioxide gas) in his furnace products at the breeching. When he had finally determined this, and had brought it up to his liking, it would have been time enough to hunt for the efficiency of his boiler or furnace. Don't commence at the top to run an efficiency test in a boiler house or on a metallurgical furnace. Commence at the coal pile and go up, if you are really looking for results. If more boiler tests were commenced at the coal pile, carried through the furnace and breeching, and finally to the absorbing surfaces, instead of beginning at the absorbing surfaces, more data of value would be on record and more smokeless stacks would exist. After all, the last word in smoke prevention with our high volatile coals is and must remain at least 14 to 16 per cent of CO_2 gas in our products of the furnace, whether such furnace may be for metallurgical, stationary, or locomotive purposes.

But some may ask, how are we to know when we have the correct, or approximately correct, volume of air for complete combustion? First, and accurately, by the use of a good CO_2 recorder. Second, and approximately, by the intelligent and occasional observation of the top of the stack. Never, when you are not using a CO_2 recorder, let the top of your stack run absolutely clear, if you expect the best average efficiency from your furnace. If, on the other hand, you have no combustion recorder to guide you, and you are running an absolutely clear stack, your surplus air may not only be enough, but it may be many times more than is required for high furnace efficiency, and while a practically smokeless stack always accompanies high furnace efficiency, on the contrary, as you have seen, a smokeless stack does not always indicate such efficiency.

The greatest difficulty in burning bituminous coal smokelessly and with high furnace efficiency lies in the fact that it burns partly as a solid and partly as a gas, and that the gas must be burned in a time much shorter than is required to burn the solids. It may be of interest to note that 100 analyses recently made by the city of Pittsburgh have shown that an average of 42.3 per cent of the total heat developed by the average Pittsburgh coal is contained in the volatile combustibles, and that for the combustion of this hydrocarbon content a fixed portion of air supply is required, over the fire. After some 13 years, during which the writer has been constantly in touch with the steam engineers of Pittsburgh, he feels safe in offering the suggestion that these last two conditions are not given the careful consideration that is bestowed upon other details of plant operation. In other words, the adequate supply of oxygen over the fire at the moment when something like 40 per cent of the gaseous and extremely valuable hydro-carbons are being distilled is rarely, if ever, present.

METAL MARKETS

New York

Dec. 2.

Copper.—Electrolytic copper continues to be offered generally at prices equivalent to 14.50c, cash New York, but domestic consumers still refuse to become interested in closing for their future requirements. Such sales as are made are simply to cover current requirements. There is a small volume of selling to foreign consumers on the basis of 14.62½c, c. i. f. European ports. Casting copper is freely offered at 14.25c, cash, but there is no demand to speak of. One of the lake producers is offering prime lake at 15c, cash, but no actual sales are heard of. The standard copper market has not displayed any particular strength during the week. During the week there was a net loss of 13s 6d in the price of spot standard. Today's close was £65 15s for spot and £64 for three months. During the week 2,300 tons of spot standard and 8,900 tons of three months were sold on the London exchange. Exports of copper during the month of November amounted to 29,508 tons.

Spelter.—Demand for spelter is almost totally lacking and there are no indications of strength in this market. Prime western brands in carload lots may be quoted at 4.95 cents, East St. Louis, or 5.10 cents for New York delivery.

Tin.—The price of tin today for delivery over December and January is 38.62½c. Demand continues to drag and the situation is weak. During the week the tendency has been constantly toward lower prices. The statistics for November were poor, as was expected. While arrivals during the month totaled only 2,477 tons, stocks at the end of the month, including those on dock and landing, amounted to 2,034 tons. During the month deliveries into consumption in this country only amounted to 2,800 tons, and consumption continues to fall off. The total visible supply in Europe and America is estimated to have increased by about 2,000 tons.

The decline in the price of spot tin during the week on the London exchange was £2 10s. Today's close was £176 10s for spot and £177 10s for three months.

IRON AND STEEL PRICES

Pig Iron

PITTSBURGH

(Through This Year and First Half 1914.)

Bessemer	$15.90 to 16.15
Basic	13.90
No. 2 foundry	14.40 to 14.65
Malleable	14.40 to 14.65
Gray forge	13.90

(The freight from valley points is 90c.)

CLEVELAND

(Through First Half 1914, Delivered in City.)

No. 1 foundry	$15.00
No. 2 foundry	$15.00
No. 2 southern	15.35
Bessemer	15.90
Silveries, 8 per cent silicon	18.55

CINCINNATI

(Fourth Quarter and First Half.)

Southern foundry No. 1	$14.75 to 15.25
Southern foundry No. 2	14.25 to 14.75
Southern foundry No. 3	13.75 to 14.25
Southern foundry No. 4	13.50 to 14.00
Southern gray forge	13.25 to 13.75
Mottled	13.25 to 13.50
Southern No. 1 soft	15.00 to 15.50
Southern No. 2 soft	14.50 to 15.00
Standard southern car wheels	27.25 to 27.75
Southern Ohio No. 2	14.70 to 15.20
Southern Ohio No. 3	14.20 to 14.70
Southern Ohio No. 4	13.95 to 14.45
Silveries, 8 per cent silicon	18.20 to 18.70

(Freight from Ironton, $1.20; from Birmingham, $3.25.)

CHICAGO

(Delivered Chicago, until July 1, 1914, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnace.)

Lake Superior char., No. 1 to 4	$15.50
Northern foundry No. 2	14.50
Southern foundry No. 2	15.35
Jackson Co. silveries, 8 per cent	19.40
South'n silveries, 5 per cent sil.	16.85
Alabama basic	15.35
Malleable	14.50

PHILADELPHIA

(Prompt and third quarter shipment delivered to consumers' plants, in Philadelphia and vicinity, unless otherwise specified.)

Northern No. 1X foundry	$15.50 to 15.75
Northern No. 2X foundry	15.25 to 15.50
Northern No. 2 plain	15.00 to 15.25
Standard forge (Eastern Pa.)	14.50 to 14.75
Virginia No. 2X	15.80
Southern No. 2	15.00 to 15.50
Standard low phos., Phila.	21.50 to 22.00
Lebanon low phos., furnace	17.50 to 18.00
Malleable	15.75 to 16.00
Basic (Eastern and Central Pa.)	15.00
Middlesbrough, English No. 3 (on docks)	14.25 to 14.50

NEW YORK

(Prompt and third quarter delivery, prices based at Jersey City and tidewater.)

Northern No. 1X foundry	$15.25 to 15.50
Northern No. 2X foundry	15.00 to 15.25
Northern No. 2 plain	14.75 to 15.00
Virginia No. 2X	15.80
Southern No. 2	14.75 to 15.25
Malleable	15.00 to 15.50
Gray forge	14.50 to 14.75

ST. LOUIS

(Throughout This Year.)

Southern No. 1	$15.75 to 16.25
Southern No. 2	15.25 to 15.75
Southern No. 3	14.75 to 15.25
Southern No. 4	14.25 to 14.75

(Freight, Birmingham to St. Louis, $3.75.)

BIRMINGHAM

(For Southern Delivery.)

No. 1 foundry	$11.50 to 12.00
No. 2 foundry	11.00 to 11.50
No. 3 foundry	10.75 to 11.00
No. 4 foundry	10.50 to 10.75
Gray forge	10.50 to 10.75
Mottled	10.25
Standard basic	11.00 to 11.50
Off basic	10.50 to 11.00
Charcoal	25.00

BUFFALO

(Delivered in city over remainder of year and first quarter of 1914.)

No. 1 foundry	$13.75 to 14.00
No. 2X foundry	13.50 to 13.75
No. 2 plain	13.25 to 13.50
No. 3 foundry	13.25
Gray forge	13.00 to 13.25
Malleable	13.50 to 14.00
Basic	14.00 to 14.50
Charcoal	15.50 to 16.50
Charcoal (special grades and analysis)	17.00 to 19.50

Ferro Alloys

English 80 per cent ferro manganese, prompt and forward delivery, $47, seaboard.

Fifty per cent ferro-silicon on contracts, $75, Pittsburgh, or Philadelphia, for carloads; $74 for larger lots and $73 for 600 tons or more. Twelve to 13 per cent, $24. Eleven to 12 per cent, $23. Ten to 11 per cent, $22. Nine to 10 per cent, $21, f. o. b. Globe, Jisco, and Ashland furnace. Freight to Pittsburgh, $1.90.

Ferro-carbon titanium 8 cents per pound for carload lots; 10 cents per pound for 2,000-pound lots and over; 12½ cents per pound in lots up to 2,000 pounds.

Freight rates on ferro-manganese, foreign spiegeleisen and electrolytic ferro-silicon from Baltimore to Pittsburgh, $2.16; to Youngstown, $2.48; to Cleveland, $2.57; to Detroit and Columbus, $2.99; to Cincinnati, $3.40; to Chicago and Milwaukee, $4.00. Freights from Philadelphia and New York, 10 to 30 cents higher, respectively.

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds, to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
Denver	84½ cents
St. Louis	22½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, shapes and plates	80 cents

Coke

AT THE OVENS.

	Prompt shipment.	Contract.
Connellsville district:		
Foundry coke	$2.40 to 2.75	$2.65 to 2.75
Furnace coke	1.75 to 1.85	1.80 to 2.00
Wise county district:—		
Foundry coke	$2.50 to 3.10	$2.65 to 3.10
Furnace coke	2.10 to 2.25	2.25 to 2.50
Pocahontas district:—		
Foundry coke	$2.50 to 3.00	$2.50 to 3.00
Furnace coke	2.00 to 2.40	2.15 to 2.60
New River district:—		
Foundry coke	$2.85 to 3.50	$2.85 to 3.50
Furnace coke	2.50 to 2.75	2.50 to 2.75

Iron Ore

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, prices are: Old range Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40; all at lower lake ports.

Foreign iron ores, 7½ to 8 cents per unit, f. o. b. cars eastern seaboard. Freight rates from Philadelphia to eastern Pennsylvania furnace points range from 35 to 75 cents per ton.

Semi-Finished Material

PITTSBURGH

Bessemer 4 x 4 billets with 0.25 carbon and less, $20.50; open-hearth rolling billets, $20.50; Bessemer sheet bars, $21.00; open-hearth sheet bars $21.00, f. o. b. makers' mill. Forging billets, $25, Pittsburgh. Wire rods, $26; muck bar, $30, Pittsburgh.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: 4 x 4-inch open-hearth and Bessemer, rolling billets at $23.30 to $23.80, and forging billets at from $28.00 to $29.00; muck bar, $28.00 to $30.00.

Standard Shapes

PITTSBURGH

Standard structural shapes, 1.25c to 1.30c. For extras see card of Sept. 1, 1909.

CHICAGO

Standard structural shapes, 15 inch and under, 1.43c to 1.48c.

PHILADELPHIA

Standard structural shapes, base sizes, delivered to consumers' plants in Philadelphia and vicinity, 1.35c to 1.45c.

NEW YORK

Standard structural shapes, base sizes, delivered in metropolitan district, 1.41c to 1.46c.

Plates

PITTSBURGH

Standard steel plates ¼ inch thick, 6¼ to 100 inches, 1.20c to 1.25c. For extras, see card of Sept. 1, 1909.

CHICAGO

Tank plates, 1¼ inches thick, 6¼ to 100 inches wide, 1.38c.

PHILADELPHIA

Tank plates, base sizes, delivered to consumers' plants in Philadelphia and vicinity, 1.35c to 1.45c.

NEW YORK

Tank plates, base sizes, delivered in the metropolitan district, 1.36c to 1.41c.

Sheets and Tin Plate

PITTSBURGH

No. 28 black	1.90c to 2.00c
No. 28 tin mill black	1.85c to 1.95c
No. 28 galvanized	2.90c to 3.00c
No. 10 blue annealed	1.45c to 1.50c
No. 28 painted corrugated	2.10c to 2.20c
No. 28 galvanized corrugated	3.00c to 3.10c
Tin plate, 100-pound cokes	$3.40

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: No. 10 gage annealed sheets at 1.60c to 1.65c.

Pipe and Boiler Tubes

PITTSBURGH

	Black	Galv. Butt-Weld.
Steel, ⅜ to 3 inches	80	71½
Iron, ⅜ to 2½ inches	70	61
		Lap-Weld.
Steel, 2½ to 6 inches	79	70½

BOILER TUBES

Steel, 3½ to 4½ inches	69	..
Iron, 3½ to 4½ inches	58	..

Other sizes of pipe and tubes take the usual advances as per official cards.

Rails and Track Material

PITTSBURGH

Steel rails, 50-pound and heavier, 1.25c per pound for Bessemer and 1.35c for open-hearth, carload lots; less than 500 tons, 1.35c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c base, Pittsburgh; track bolts, 2.15c base, Pittsburgh.

Railroad spikes, 4½, 5 and 5½ and 9-16 inch, 1.55c.

CHICAGO

Light rails, carloads, 25 to 45-pound, 1.25c, base; 16 to 20-pound, 1.30c; 12-pound, 1.35c; 8-pound, 1.40c.

Light section relayers, 45 pounds and under, subject to inspection, $21.50 to $22.50; standard section relaying rails, subject to inspection, $23 to $24.

Track fastenings, f. o. b. Joliet:

Angle bars, 1.50c; railroad spikes, 1.60c to 1.65c; smaller size spikes, 1.85c base; track bolts with square nuts, 2.10c to 2.20c.

Bars, Hoops and Bands

PITTSBURGH

Common iron bars, 1.40c to 1.45c, Pittsburgh; Bessemer and open-hearth steel bars, 1.25c to 1.30c; plow and cultivator, 1.25c to 1.30c; channels, angles, zees, tees, under 3 inch, 1.35c to 1.40c, all f. o. b. mill.

Hoops, in carload lots, 1.45c to 1.50c, Pittsburgh; in less than carload lots, 1.50c to 1.55c; bands, 1.25c to 1.30c base, with net extras as per standard steel.

Cold rolled and ground shafting, 62 to 63 per cent off in carloads and 57 to 58 per cent in less than carloads delivered in base territory.

CHICAGO

Bar iron, 1.15c to 1.20c; hard steel bars rerolled, 1.35c; soft steel bars, bands and small shapes, 1.43c; hoops, 1.53c; smooth finished machinery steel, 1 inch and larger, 1.73c; shafting, 60 per cent off list for carload lots, 55 per cent off for less than carloads.

PHILADELPHIA

Delivered in consumers' plants in Philadelphia and vicinity: Steel bars, 1.45c to 1.50c on contract and common bar iron, 1.25c to 1.35c. Cut nails 1.80c to 1.90c, Philadelphia. Shafting 62 and 60 off in carloads and 57 and 55 off in less than carloads in base territory.

NEW YORK

Soft steel bars delivered in the metropolitan district, 1.46c; common iron bars, 1.25c to 1.30c.

Bolts, Nuts and Rivets

Rivets

Button head structural rivets, 1.80c to 1.85c, Pittsburgh; cone head boiler rivets, 1.90c to 1.95c. Small rivets, 80 and 10.

Structural rivets, Chicago, 1.85c; boiler rivets, 0.10c extra.

Bolt and Nut Discounts

(Delivered within 20-cent freight radius.)

Carriage bolts, ¾ x 6 inches, small and shorter, rolled threads, 80 and 2½; cut threads, 75 and 17½; larger and longer, 70 and 15.

Machine bolts with hot pressed nuts, ¾ x 4 inches, smaller and shorter, rolled 80 and 7½; cut, 80 and 2½; larger and longer, 70, 10 and 10.

Gimlet and cone point lag or coach screws, 80 and 20.

Hot pressed square, blank or tapped nuts, $6.00 off list; hot pressed hexagon blank or tapped, $6.70.

Cold pressed C. & T. square, blank, or tapped, $3.80 off; hexagon, blank or tapped, ⅝ inch and larger, $6.80 off; ½-inch and smaller, $7.40.

Wire Products

PITTSBURGH

Wire nails, jobbers' carload lots, $1.55 to $1.60; retailers' carload lots, $1.60 to $1.65; cut nails (wetsern makers). jobbers' lots, $1.60; painted barb wire, jobbers' carload lots, $1.55 to $1.60; retailers' carload lots, $1.60 to $1.65; plain wire to jobbers in carloads, $1.35 to $1.40; and to dealers in carloads, $1.40 to $1.45; polished staples, $1.55 to $1.60; galvanized staples, $1.95 to $2.00.

CHICAGO

Wire nails, jobbers' carload lots, $1.73; retailers' carload lots, $1.78; retailers' less than carload lots, $1.83; painted barb wire, jobbers' carload lots, $1.73; retailers' carload lots, $1.78; retailers' less than carload lots, $1.83, with 40c for galvanizing; plain wire, jobbers' carload lots, $1.53; retailers' carload lots, $1.58.

Cast Iron Pipe

CHICAGO

Four-inch water pipe, $26.50; 6 to 12 inches, $25.50; larger sizes, $23.50; gas pipe, $1 a ton higher.

NEW YORK

Six-inch pipe. 30 pounds to the foot, $23 to $24, f. o. b. New York, in carload lots.

BIRMINGHAM

Water mains, 4-inch, $2.50; 6-inch and up, $19.50. Gas main: $1 per ton higher than water main. Special fittings, $47.50 to $52.50.

Old Material

PITTSBURGH

(Gross Tons Delivered.)

Heavy melting scrap	$11.25 to 11.50
Rerolling rails	13.50 to 14.00
Malleable	10.50 to 10.75
Bundled sheet scrap	6.50 to 7.00
Iron axles	22.00 to 23.00
Old iron rails	13.00 to 13.50
Stove plate	8.50 to 9.00
No. 1 wrought scrap	12.00 to 12.50
Old car wheels	11.00 to 11.50
Low phosphorus	13.50 to 14.00
Machine shop turnings	6.25 to 6.50
No. 1 busheling	9.00 to 9.25
Cast borings	7.00 to 7.50
No. 1 cast scrap	11.00 to 11.50

PHILADELPHIA

Gross tons delivered to consumers' plants, in eastern Pennsylvania and western New Jersey:

Old iron rails (nominal)	$16.00 to 16.50
Old steel rails (rerolling)	12.75 to 13.25
No. 1 heavy melting steel	10.00 to 10.50
Old car wheels	12.25 to 12.75
Old iron axles (nominal)	22.00 to 23.00
Old steel axles	16.00 to 16.50
No. 1 railroad wrought	13.50 to 14.00
Wrought pipe	9.00 to 9.50
Cast borings	7.50 to 7.75
Machine shop turnings	7.00 to 7.50
Heavy cast (broken)	12.50 to 13.00
Malleable	10.00 to 10.50
Stove plate	9.00 to 9.50
No. 1 forge	8.00 to 8.50
Low phosphorus	14.50 to 15.00

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg, and Steelton, Pa.; $1.40 to Milton, Pa.

CLEVELAND

Gross Tons

Old iron rails	$12.50
Old steel rails (under 3 ft.)	12.00 to 12.50
Old steel rails (over 6 ft.)	11.50 to 12.00
Relaying rails	23.00 to 25.00
Old steel boiler plate	8.00 to 8.50
Malleable iron (railroad)	10.50 to 11.00
Axle turnings	6.00 to 6.50
Steel axles	16.50 to 17.00
Malleable iron (agricultural)	8.50 to 9.00
Heavy steel	9.50 to 9.75
Country mixed steel	8.00 to 8.50
Bundled sheet scrap	6.50 to 7.00

Net Tons

No. 1 R. R. wrought	$10.50 to 11.00
No. 1 busheling (new)	8.00 to 8.50
No. 1 busheling (old)	7.75 to 8.00
No. 1 machine cast	10.50 to 11.00
No. 1 dealers' wrought	8.00 to 8.50
Machine shop turnings	4.00 to 4.50
Pipes and flues	7.00 to 7.50
Wrought drillings	4.00 to 4.50
Cast borings	5.00 to 5.50
Stove plate	8.00 to 8.25
Wrought iron arch bars (nom.)	13.00
Wrought iron piling plate (nom.)	13.00

CHICAGO

(Delivered in consumers' yards.)

Gross Tons

Old car wheels	$11.25 to 11.75
Rerolling rails (5 ft. and over)	11.50 to 12.00
Old steel rails (3 ft. and und.)	10.50 to 11.00
Frogs, switches and guards	9.00 to 9.50
Heavy melting steel	9.00 to 9.50
Shoveling steel	8.00 to 8.50

Net Tons

No. 1 R. R. wrought	$8.50 to 9.00
No. 2 R. R. wrought	7.50 to 8.00
Arch bars and transoms	12.00 to 12.50
Knuckles, couplers and springs	9.00 to 9.50
Shafting	13.00 to 13.50
Iron car axles	18.00 to 18.50
Steel car axles	12.25 to 12.75
Locomotive tires	10.50 to 11.00
Cut forge	7.50 to 8.00
Pipe and flues	6.50 to 7.00
No. 1 cast	10.00 to 10.50
No. 1 busheling	7.25 to 7.75
No. 2 busheling	5.75 to 6.25
No. 1 boiler cut	7.00 to 7.50
Boiler punchings	9.50 to 10.00
Cast borings	4.00 to 4.50
Machine shop turnings	4.25 to 4.75
Agricultural malleable	8.50 to 9.00
Railroad malleable	9.00 to 9.50
Angle bars, splices, etc., iron	12.00 to 12.50
Angle bars, steel	7.75 to 8.25
Stove plate and light cast scrap	8.75 to 9.25

NEW YORK

Gross tons, New York dealers' prices at tidewater, usually for eastern Pennsylvania delivery:

Old car wheels (nominal)	$10.50 to 11.00
Heavy steel axles	15.25 to 15.50
Steel shafting	13.00 to 13.25
No. 1 heavy melting steel	8.00 to 8.25
No. 1 R. R. wrought	11.00 to 11.25
Wrought pipe (not galvanized)	7.00 to 7.25
Cast borings	4.75 to 5.00
Machine shop turnings (nominal)	4.50 to 4.75
Heavy cast	10.00 to 10.50

Stove plate	6.75 to 7.00
Grate bars	6.50 to 6.75

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York.

CINCINNATI

Gross Tons

Old iron rails	$11.00 to 11.50
Old steel re-rolling	9.50 to 10.00
Old iron axles	15.50 to 16.00
Heavy melting scrap	8.50 to 9.00
Relaying rails	18.50 to 19.00

Net Tons

Old No. 1 R. R. wrought	$ 8.50 to 9.00
Bundled sheet scrap	4.50 to 5.00
No. 1 yard wrought	6.50 to 7.00
No. 1 machine cast	9.50 to 10.00
No. 1 busheling	6.00 to 6.50
Stove plate	6.75 to 7.25
Machine shop turnings	4.00 to 4.50
Cast borings	4.00 to 5.00
Heavy turnings	5.00 to 5.50
Mixed cast	7.50 to 8.00
Breakage	5.00 to 6.00
Malleable	6.50 to 7.00

BIRMINGHAM

Old iron axles (light)	$15.00 to 15.50
Old steel axles (light)	15.00 to 15.50
Old iron rails	12.50 to 13.50
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	10.00 to 10.50
No. 1 steel scrap	10.50 to 11.00
Standard car wheels	12.00 to 12.50
Tram car wheels	10.50 to 11.00
Light cast and stove plate	8.00 to 8.25

BUFFALO

Gross Tons

Heavy melting steel	$ 9.75 to 10.50
No. 1 R. R. and mch. cast scrap	12.00 to 12.50
No. 1 R. R. wrought scrap	12.00 to 12.50
Old steel axles	17.00 to 17.50
Old iron axles	22.50 to 23.00
Car wheels	11.75 to 12.25
Railroad malleable scrap	11.00 to 11.50
Machine turnings	5.00 to 5.50
Heavy axle turnings	8.00 to 8.75
Cast iron borings	5.50 to 6.00
Low phos. steel scrap	16.50 to 17.00
Old iron rails	15.00 to 15.50
Boiler plate sheared	11.50 to 12.00
Bundled sheet scrap	6.50 to 7.00
Stove plate (net ton)	9.75 to 10.00
Locomotive grate bars	9.50 to 10.00
No. 1 busheling scrap	9.00 to 9.50
No. 2 busheling scrap	7.00 to 7.50
Wrought pipe	8.50 to 9.00

ST. LOUIS

(Dealers' buying prices.)

Gross Tons

Old car wheels	$10.25 to 10.75
Old iron rails	11.00 to 11.50
Re-rolling rails (5 ft. and over)	10.50 to 11.00
Old steel rails (3 ft. and und.)	9.00 to 9.50
Light sec. relayers (45 pounds and und.) subject to inspec.	23.00 to 23.50
Relaying rails subject to inspec.	23.00 to 23.50
Frogs, switches and guards	8.50 to 9.00
Shoveling steel	8.00 to 8.50

Net Tons

No. 1 railroad wrought	$ 9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Arch bars and transoms	12.00 to 12.50
Knuckles, couplers, springs	8.00 to 8.50
Shafting	12.50 to 13.00
Steel car axles	14.00 to 14.50
Iron car axles	17.00 to 17.50
Locomotive tires	10.00 to 10.50
Pipe and flues	6.00 to 6.50
Tank iron and cut boilers	6.00 to 6.50
No. 1 cut busheling	8.00 to 8.50
Cast iron borings	3.00 to 3.50
Machine shop turnings	4.00 to 4.50
Railroad malleable	7.50 to 8.00
Agricultural malleable	6.00 to 6.50
Stove plates	7.00 to 7.50
Angle splice bars (iron)	10.00 to 10.50
Angle splice bars (steel)	8.00 to 8.50

Store Prices

CINCINNATI

Steel bars, 1.85c to 2.00c; iron bars, 1.80c to 1.90c; plates and shapes, 1.95c to 2.10c; sheets, blue annealed, No. 10, 2.15c to 2.20c; black No. 28, 2.65c; galvanized, No. 28, 3.75c; cold rolled shafting, round, square, hexagon and flat, 55 to 58 off.

CLEVELAND

Steel bars, 1.85c; plates and shapes, 2.00c; iron bars, 1.85c; sheets, No. 10 blue annealed, 2.15c; No. 28 black, 2.60c; No. 28 galvanized, 3.60c.

CHICAGO

Steel bars, 1.75c; iron bars, 1.75c; hoops, 2.25c; shapes and plates, 1.85c; No. 10 blue annealed sheets, 2.05c, black, No. 28, 2.65c; galvanized, No. 28, 3.65c to 3.70c.

PHILADELPHIA

Steel bars, 1.85c to 1.90c; structural shapes, 1.85c to 1.95c; plates, 1.85c to 1.95c.

NEW YORK

Steel bars, 2.00c; structural shapes, 2.05c; plates, 2.05c.

MILLS RESIST

Making Lower Prices—Foreigners Not Anxious to Compete.

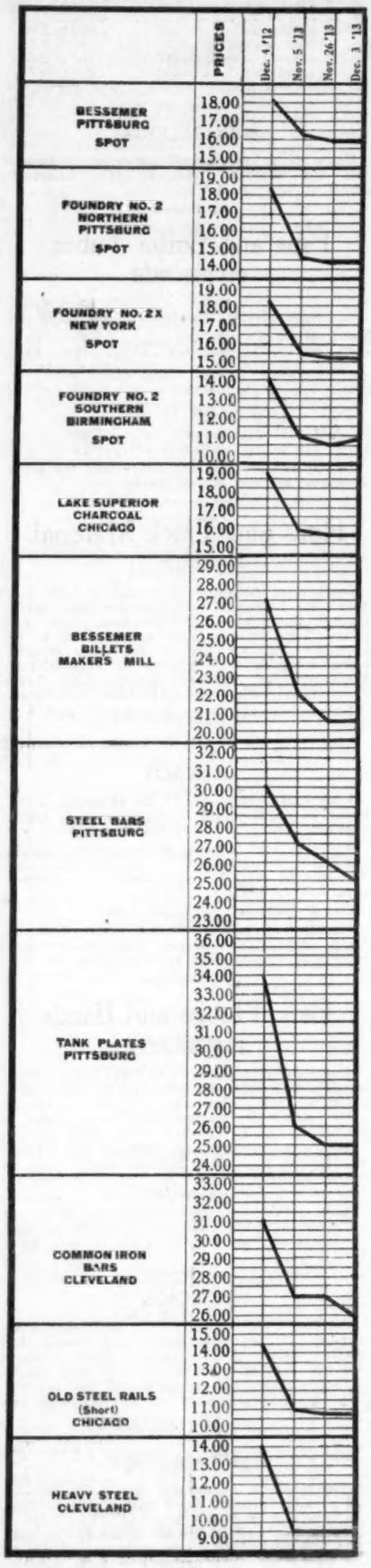
New York, Dec. 3. (By wire.)—There is a noticeable check to the downward tendency in finished prices reported from some quarters in the trade and mills seem to be offering greater resistance to further concessions. Low conditions of stocks generally continue and the opinion is expressed in well informed circles that when buyers become convinced that the decline has been arrested, a general movement will result.

Considerable contracting for tin plate has been done during the past week by buyers in the New York district, with the leading interest, the American Sheet & Tin Plate Co., which expects practically normal operations during the first half of 1914.

The structural bookings of the past week was about 20,000 tons, of which 12,000 tons went to American Bridge Co. shops. This interest is well filled for three or four months ahead.

Advices from abroad state that foreign makers are refusing to contract at prevailing low price levels of the market, as the mills prefer to cut operations for the present and to take chances for future business at better prices. There is some firming up from minimum prices of certain lines in Germany.

PRICE CHART



Plenty of Competition in Iron Trade

Told About in Steel Corporation Dissolution Suit Hearings—Railroad Purchasing Agents Find Quotations Vary

In the United States Steel Corporation dissolution suit last week the taking of testimony to show competitive conditions was continued. The testimony of C. S. Rindsfoos, secretary of the Foundation Co., of New York, tended to contradict the statements made by Dr. Walker, of the Bureau of Corporations, or rather to disprove his theory that trade paper quotations continuing unchanged for a considerable time indicate control of the market by price agreements among various manufacturers.

Mr. Rindsfoos testified that his company is a large buyer of reinforcing bars. He had found that prices quoted by manufacturers varied all the way from 10 cents below to 30 cents above the prices published contemporaneously in the trade papers.

William Heyburn, president of the Belknap Hardware Mfg. Co., Louisville, Ky., said he was the managing buyer of the company from 1886 to 1910. At present, it is buying 78 per cent of its bars from the Carnegie Steel Co. and 22 per cent from the Cambria and Republic companies. He had found that quotations on the various products vary, and during the past ten years, at least, competition has been very sharp.

Chas. M. Wambaugh, president of the Columbus Chain Co., Columbus, O., buys wire rods and steel and iron bars. The company asks bids from various manufacturers and quotations are found to vary considerably. The American Steel & Wire Co., he said, has been a factor which tended to keep the market from running away in times of prosperity, and also from going below a reasonable level in times of depression.

H. S. Montgomery, of Elizabeth, N. J., testified that for eight years he has been in charge of the purchasing department of the Lehigh Valley railroad, purchasing everything except rails. Before letting contracts, the road asks for quotations from the various manufacturers and the figures received generally vary considerably. There are only a few commodities, he said, in which he remembers that the prices were ever uniform. George F. Baker and Charles Steele, he testified, are directors of the Lehigh railroad as well as of the Steel Corporation, but he did not know of this connection until a few days ago. They had never influenced him in any way or endeavored to have him place orders with the subsidiaries of the Steel Corporation. On cross-examination, when asked whether he submitted inquiries during the year 1910 to the different manufacturers, Mr. Montgomery said:

"I do not think that we submitted them at all. That is a peculiar thing and requires an explanation. Our people have very strict specifications, you know, for boiler and fire-box steel, and this material must meet those specifications. We have found, and it is the experience for a number of years, that Worth Bros., of Coatesville, and the Lukens Iron & Steel Co., which is also of Coatesville, have invariably furnished us steel that met those specifications, and we had no trouble. At the same time, they have kept us right down to the market. There is competition between the two, and if Lukens notifies us, as they did a week or ten days ago, that they have cut the price $1 a ton, Lukens gets all the business until Worth wakes up and comes in and meets that price. We do not ask bids."

William M. Crane, Whitestone, L. I., president of the Wm. M. Crane Co., manufacturer of gas appliances, testified that his company buys principally sheet steel and pipe. He said quotations received always vary.

Willard R. Collins, Newark, N. J., purchasing agent of the Erie railroad, testified that steel products were bought generally on contract, after competitive bids have been received from manufacturers. He has found that the quotations from various steel makers vary. Until a few days ago, he did not know that George F. Baker, Charles Steele and Norman B. Ream were directors of the Erie railroad and also of the Steel Corporation. They never tried to influence purchases in favor of the Steel Corporation subsidiaries.

John D. Landis, purchasing agent of the Philadelphia & Reading, the Central Railroad of New Jersey and several allied coal companies, testified that he buys from 65,000 to 70,000 tons of steel products a year, his policy being to purchase from steel companies having plants on the railroad lines for which he purchases. He testified to active competition in the steel industry. He said that Charles Steele, H. C. Frick and Geo. F. Baker, directors of the Steel Corporation, are also directors of the Philadelphia & Reading and Central Railroad of New Jersey roads, but they have never sought to influence him in awarding contracts.

FREE FROM BONDS

And Enjoying Handsome Profits—Harbison-Walker Report.

Pittsburgh, Dec. 3.—The eleventh annual statement, for the year ending Sept. 30, to be issued tomorrow by H. W. Croft, president of the Harbison-Walker Refractories Co., Pittsburgh, shows a net profit for the year of $1,525,964.34, and a surplus account of $6,090,777.12. Net earnings for the year were $1,723,463.68.

The company now is free from bonded indebtedness. Mr. Croft, in the statement to stockholders, says: "The $3,500,000 issue of bonds, due in 1922, for the payment of which a sinking fund of $175,000 per year was required, was completely retired during the past year, thereby anticipating the final payment by nine years."

The report refers briefly to increased costs during the year, and states that a larger amount of business was transacted than during the previous year. The Harbison-Walker company advanced wages from 8 to 10 per cent April 1, last. "Costs also were increased by the scarcity of labor and by the necessity of training inexperienced men," Mr. Croft states.

The annual stockholders' meeting will be held Jan. 19, 1914.

Keystone Furnace Improved

The Keystone furnace of the Reading Iron Co. at Reading, Pa., went into blast on Nov. 26. While out of blast for repairs, there has been installed a complete system of stock handling equipment consisting of stock bins and trestles, skip hoist, etc. The stock bins and trestle piers are built of reinforced concrete similar in design to the bins at the Reading Iron Co.'s Crumwold furnace at Emaus, Pa. Frank C. Roberts & Co., Philadelphia, were the engineers in charge of the improvements.

The contract for section 5 of the Wellington ship canal has been awarded by the Canadian government to the Canadian Dredging Co. at $1,945,788. It includes the section between Allenburg and Port Robinson. Only one section remains to be put under contract.

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Market Reports in Court

In reading reports of some of the hearings in the Steel Corporation dissolution suit, one could easily imagine that the trade papers rather than the Steel Corporation were on trial, for many witnesses have been asked whether they could buy at lower figures than the prices quoted by trade papers, and the answer almost invariably has been that they could. One witness testified last week that prices as quoted by manufacturers of steel reinforcing bars varied from 10 cents below to 30 cents above the price which was published contemporaneously in the trade papers, the testimony showing that the published prices are sometimes too low, but it is natural for a buyer to be glad to tell about a good bargain he has made, and so most of the witnesses have said that the trade paper quotations are too high.

The motive of the Steel Corporation attorneys in adopting this line of examination of witnesses is easily understood by anyone who has followed the testimony from the beginning. The contention of the government has been that when the prices as published and as indicated by the charts of the trade papers show that a price continues unchanged for a considerable time, it is evidence of an artificial maintenance of prices. For example, Prof. Francis Walker held that the even lines and parallel lines on the chart continuing over considerable periods of time invariably indicated artificially controlled prices. This theory of the government could easily be attacked, and one of the methods of showing its fallacy has been to endeavor to show that published prices do not prove that other prices are not made.

No trade paper ever claimed that a single price could be named as the only price of a product at which any purchase could be made. No trade paper ever asserted that prices could be determined with mathematical exactness. Market reporting rests upon the experience and truthfulness of the men whom the market reports interview. A shrewd buyer often can do better than one who is not so skillful. A large buyer almost invariably can place his orders at lower prices than one whose requirements are small. In publishing prices in figures, some range can be given, but in drawing a diagram to show the fluctuations of the market, one price must be selected. Hence a chart cannot be absolutely correct.

Market conditions and prices in the iron business are more fully and accurately reported than in any other kind of commercial activity. Buyers and sellers give information with great freedom in regard to their business transactions. Gradually, the market reports of the past 20 years have become more exact. Instead of using general terms, as they once did, they give a vast array of specific facts to guide the judgment of the men in the market. The buyer who neglects to read market reports is always in danger of making a poor purchase. That the importance of these reports is generally recognized, not only among men in the iron trade, but by business men in general, who wish to be informed on the trend of commercial events, is shown by the increased space which the daily papers are glad to give to abstracts of market reviews of the iron trade. Taken in connection with the annual reviews published in the first issue of the New Year, the market reports are a trustworthy and complete record, not only of the ups and downs of prices, but of all the important conditions that affect the most important business of the country.

Complete market reporting is in line with progressive tendencies of the times. It is a protection for the buyer, just as greater publicity in regard to railroad rates is a protection for the shipper in enabling him to get a fair rate and in preventing all sorts of irregularities. Market reporting has come to stay and to be more and more useful to the iron trade and to business men in general, and no attack due to the exigencies of a lawsuit will interfere with the useful service which the market reports are constantly rendering.

For Better Business

After all of the muckraking articles which have appeared in magazines of the country in recent years, it is refreshing to see a magazine attempt something that is constructive, as *Everybody's* is doing in publishing a series of articles, beginning with the current number, on the general subject, "Better Business". The author of these articles, William Hard, is a writer who has an exceedingly entertaining style and is able

to be interesting, while at the same time technically accurate. In his first article, he says things which may tend to take some of the conceit out of American manufacturers, for he tells them very plainly how they are trailing behind iron and steel makers of foreign lands, and hints at what they must do if they are to meet the competition of the progressive manufacturers of Germany, England and other countries. If one may judge from the opening number, whose subtitle is "Brains Across the Sea", Mr. Hard's series will be well worth reading. They will have a decidedly good influence. He says he will have no rule but this: "Whatever checks industrial progress, though it may for the moment permit much profit-taking, is in the end a commercial disaster; and whatever accelerates industrial progress, though it may for the moment seem radical, is in the end Better Business".

Prospects for Steel Consumption

A detailed survey of the prospects for steel consumption in the next twelvemonth gives basis for a more hopeful view of the immediate future of the steel industry than does a reference to the prospects for business generally. The latter is the more frequent recourse of those in the trade when they endeavor to pry into the future. The great majority of the authorities in the United States take a gloomy view of at least the immediate future in business, though Sir Groge Paish, editor of *The Statist*, takes quite a hopeful view of American business conditions.

The outstanding feature in the changing conditions as to steel consumption is that the proportion of steel entering into large structures, individual enterprises, is decreasing, while the volume of steel entering into common every-day consumption is increasing. This fact has been mentioned before, but it will bear repetition until its full import is realized universally. The amount of activity in the large undertakings fluctuates widely from year to year, since such undertakings must be financed. In the final analysis, the actual consumption or use of the steel involved is not in the construction, but in the use of the structure. Thus we should regard the consumption of a rail or of a bridge as the passage of men or materials over it, and the consumption of structural steel, etc., in an office building or hotel as the occupancy of the rooms in the structure. Such use of the facilities varies much less from year to year than does the construction of the track, the bridge, or the office or hotel building. When the use of steel is more direct, as in the purchase by the masses of articles made from steel, from the automobile to the tin container, the demand for the steel involved is more uniform.

For instance, there was a time when more than one-half of all the iron and steel produced passed to the railroads. It is quite conceivable that railroad work could have practically ceased for a year, whereby that one event would have decreased the iron and steel consumption by one-half. On the other hand, it is altogether inconceivable that the purchase by the public of articles contained in tin cans and boxes should cease for a year, or even be reduced by one-half, and the country is making tin plate at the rate of 1,000,000 gross tons a year, the domestic consumption of tin plate being fully one-third the consumption of rails.

By changes in the distribution of steel into the various finished forms during the past few years, it results that the consumption is much more uniform than formerly, and the demand is correspondingly more uniform. Such changes as have occurred since 1908 in the rate of steel production have been produced chiefly by a variation in the quantity of steel in transit from mill to final employment, rather than by changes in the rate of actual ultimate consumption. The activities of the people have varied relatively little. For instance, in January and February, 1911, mill shipments were no more than half as great as in the same months of 1910, but no one assumes for a moment that the consumption of steel by the people was only one-half as great.

Again the steel industry is faced with a condition of operating at half capacity, but it is certain that such a pace cannot continue. The example of 1911 just cited is a case in point, for mill activities increased during 1911, even though prices were falling. The lowest prices were reached in November, but before that time mill operations had increased to fully 75 per cent of capacity. In some quarters in the trade, the belief is tenaciously held that there can be no activity or prosperity unless there is forward buying, but the dictum did not hold good in 1911. There was no real forward buying until nearly the close of that year. Any appearance of forward buying in the earlier part of the year was deceptive, for prices were falling and contracts in such cases do not hold good. There was an increase of one-half in mill operations before the price situation was liquidated.

There is excellent reason for believing that an increase in mill operations at this time need not await an upturn in the market causing a buying movement for forward delivery. The present halt in shipments is due to a liquidation of stocks and as those stocks are known to be small, it will not take long to liquidate them.

Finished Steel Contracts

In THE IRON TRADE REVIEW of March 7, 1912, under a caption the same as above, it was pointed out that the condition tending to justify the familiar form of steel contract, amounting practically to an option, had disappeared, because the uniform market, due to co-operation, had disappeared. With such a market, there was always the possibility of a break, and the buyer demanded protection against such a contingency. Reference was made at that time to the fact that some steel sellers were endeavoring to set a good example by limiting their sales under that form of contract, adopting the motto "A Contract is a Contract".

It is of interest to observe, inasmuch as the market has had an upward and downward movement since those words were written, that the steel industry as a whole did not fare nearly as well during the movement as would have been the case if the making of forward contracts had been more limited. The options given proved favorable to the seller and were fully exercised, to such an extent that the general average of realized prices on shipment never rose to the market level, although as to the majority of finished steel products there were no changes in prices from October, 1912, until last midsummer. The mills lost by accepting contracts, or rather giving options, as freely as they did.

The time is approaching when the thing will be tested again, and it is to be seen whether the mills will be equally free in granting options at low prices on the eve of an advance in the open market quotations.

IRON MINING NEWS

Mines Curtailing

Various curtailments of industrial operations have taken place in the Lake Superior iron region within recent weeks, as has been noted from time to time. Some of these have been due to the action of the mining companies in putting their properties on a winter basis and are, as a rule, customary at the close of navigation. But other curtailments have undeniably been due to the less favorable conditions noted in the iron and steel trade and there is apprehension that further measures of the kind will be recorded. It is certain that much less ore will be mined during the winter than was indicated a few months ago. The most recent curtailment of operations has been noted in the Iron River district of the Menominee range. In that region, Pickands, Mather & Co. have laid off a large number of miners. The Baltic and Bengal mines have been closed, excepting that at the latter property a small crew is retained to sink a new shaft, and the Fogarty mine has been put on a single shift. The married men from these properties have been transferred to the Caspian mine, and to make room for them, most of the single men at the Caspian have been laid off, the company in this way minimizing the adverse effects as much as possible.

Shipments from Jackson Mine

The first ore from the big Mastodon find at Alpha, Menominee range, will be shipped next year. It will come from the Judson mine, of the Longyear interests, discoverers of the deposit. Both the Judson property and that part of the Mastodon tract leased to Pickands, Mather & Co., the latter christened the Balkan, are in course of development. At the Judson, a shaft 12 x 22 feet, inside measurement, is rapidly nearing the ore body. This shaft, which at its mouth is 300 feet from the ore deposit, is being sunk at an angle of 45 degrees. A blanket of quicksand overlying the ore thus is avoided and the shaft is going down in rock all the way. A miners' dry, a machine shop, a blacksmith shop, a warehouse and an office building are being erected. A power house is completed and is receiving its machinery. The Judson will be a model mine, as well as a big one. At the Balkan property, Pickands, Mather & Co. have penetrated the ledge with a timber shaft dropped through the overburden of sand. Now in jasper, the shaft will be put down 100 feet more, after which its lining of matched lumber will be replaced with concrete. The shaft is 130 feet from the ore body and the proposed open pit. The excavation of the latter will be started in the spring. The overburden to be removed consists of 1,200,000 cubic yards. It is considered unlikely that more than a sample cargo of ore will be shipped next year, this to come from the underground openings. The power house is being erected and machinery is arriving. By the spring of 1915 the Balkan will be prepared to produce heavily.

Shipped Heavily

With shipments of 95,000 tons for the season, the Antoine Ore Co. has suspended operations at its Traders mine at Iron Mountain, Menominee range, until next spring. The property is an open pit producer, wrought on the milling plan and employs 100 men. Only the pumps are in operation at the Groveland mine, in the Felch Mountain district. As the workings thus are being kept free of water, it is believed mining will be resumed shortly. The Groveland recently was put into the hands of a receiver, pending the untanglement of a perplexing financial situation. J. C. McGreevy, of Duluth, has been re-elected president of the McGreevy Steel Co., operating in the Iron River district of the Menominee. The directors are: J. W. Irwin, J. C. and John McGreevy and P. F. Chamberlain, of Duluth; James Pardee, of Salt Lake; Clayton Voorhis, of Gladstone, Mich., and F. E. Evans, of Two Harbors, Minn. It is the intention to resume work at the Purcell property, the development of which recently was suspended. Foundations for an engine house are being constructed at Oglebay, Norton & Co.'s Berkshire mine at Iron River. The building will be 40 x 90 feet. The plant of machinery to be installed will serve a second shaft, now being sunk. An unconfirmed report in the Crystal Falls district is that Pickands, Mather & Co. are to take over the Mansfield mine, until recently operated by the Steel Corporation. Angus Smith, of Detroit, and associates are the owners of the fee.

Northern Pacific Active on Cuyuna

Of interest on the Cuyuna range is the development of lands in Northern Pacific railway territory. Near Brainerd, in section 13, township 45, range 30, it is reported that the Canadian-Cuyuna Mining Co. has taken over lands in three parcels drilled by the Longyear Exploration Co. Interested in these holdings are: R. K. Whiteley, R. J. Hartley, C. A. Allbright, and others, of Brainerd. At Deerwood, it is reported that Dale & Bumgardner, of St. Paul, have secured the contract to build a Northern Pacific railway extension from Deerwood to Cuyuna, tapping the Kennedy mine and crossing Rabbit Lake. Northern Pacific railway surveyors reached Deerwood recently and went to Cuyuna to do work for the company. Bids have been asked for the grading of the Northern Pacific track to extend on the south shores of Rabbit Lake to the Kennedy mine timber shaft. This alone would substantiate the claim that the Northern Pacific expects to get some tonnage from the Kennedy, because railways do not usually run to mines unless some business is in sight.

It is reported that high grade ore is being found in section 20, township 46, range 28, where Cole & McDonald are operating drills for fee owners. It is said 68 per cent ore has been found in the southwest quarter of this section east of and adjoining the town site of Oreland, where a drill has been working all summer. The old Sealander farm lies right in the line of attraction covering the Lofholm farm, recently purchased for $20,000 by John Helmer, of Duluth.

Record Ore Movement

A record in moving ore from the Iron River district recently was established when in 13 full working days, or 312 hours, the 55,000 tons remaining in stock at the Young's mine were loaded into cars and shipped, the work being done with one steam shovel.

Officially Denied.—The report that the Cleveland-Cliffs Iron Co. is negotiating to take over certain properties, including several blast furnace plants, of the Lake Superior Iron & Chemical Co., is officially denied in most positive terms by the Cleveland-Cliffs company.

FOREIGN MARKETS

FRENCH IRON TRADE

Paris, Nov. 13.

The French attitude to the American situation is not of immediate importance, but ultimately it may assume a form that will interest more than one of the outside markets, because the iron industry in France is developing to a large extent in the form of the erection of a considerable number of new blast furnaces, and it is anticipated, reasonably enough, that when these are set alight France may have a considerable quantity of pig iron to export, the more so as these blast furnaces are some of them being erected with easy port access; for example, at Rouen, where a large quantity of pig iron will be produced within a relatively short time. This important movement, as is known, is related to the determination on the part of the masters of the iron industry, some of them being German, to exploit the north of France ironstone reserves which are already being worked to the considerable advantage of the foreign iron smelters, notably German, who are importing the ore as extracted from the North French ironstone mines.

BELGIAN IRON TRADE

Brussels, Nov. 12.

It is hoped here that we read right when we perceive some indications that the Belgian iron industry has reached very nearly the turning point. Not in pig iron, perhaps, which is still open to take orders at prices which give the market a very irregular look. There has been more done in bars, for which fair export orders have been secured, and lately at prices which represent an improvement of 1s to 2s (24½ cents to 49 cents) per ton, steel bars being mentioned up to £4 15s ($23.12), and iron bars up to £4 15s ($23.12) per ton for delivery during the first quarter of next year. Rods are quoted £4 19s ($24.09)), girders £5 11s ($27.02), plates £5 1s ($24.58½), sheets £5 9s ($26.53) for 1/16-inch and £5 9s ($26.53) for ⅛-inch. Belgian works are understood to have booked their first order for the United States, amounting to 1,500 tons of half-products for early shipment, and are understood to be negotiating for larger quantities.

Reports from England indicate that Belgian makers are offering material in that country with which the British producers cannot possibly compete. Belgian No. 3 iron, which is of sufficiently good quality to be used in the manufacture of nuts and bolts in the Darlaston (England) district is being freely offered at £5 15s ($27.99) per ton delivered, and South Staffordshire manufacturers are reported to have bought largely of it. As the lowest reported quotation for South Staffordshire common bars for nut and bolt making is £6 12s 6d ($32.25), less usual 2½ per cent discount, there is a very wide margin in favor of the Belgian product.

Russian Ferro-Manganese

(Special Correspondence.)

St. Petersburg, Nov. 16.

The report of the Russian iron industry for 1912, just issued, shows the production of ferro-manganese and similar products in that country which, as will be seen from the table, is relatively limited. As far as ferro-manganese is concerned, the manganese ore from the Caucasus is almost entirely exported from the country, whilst that produced in South Russia, a portion of which is used for the production of ferro-manganese, is limited.

	South Russia. (Donetz).	Urals.	Poland.	Total.
Speigeleisen, 12-14 per cent	529,000	30,000	.....	559,000
Speigeleisen, 19-20 per cent	1,982,000	31,000	11,000	2,024,000
Ferro manganese, 50-60 per cent	.....	.....	22,000	22,000
Ferro manganese, 78-80 per cent	1,327,000	.....	.....	1,327,000
Ferro silesia, 10-12 per cent	172,000	.....	.....	172,000
Silico speigel	123,000	.....	.....	123,000

It is obvious from the statement made above, that the importation of ferro-manganese, etc., into the country must be considerable. Unfortunately Russian customs returns and statistical reports generally are in some branches very defective, and it is impossible even to approximately estimate the quantity of these goods imported into the country for lack of particular specification in the custom house returns.

GERMAN IRON TRADE

(Special Correspondence.)

Berlin, Nov. 12.—Looking back at the past fortnight there is still no cheerful note to perceive in the iron situation here. Search for improvement reveals little. The output of pig iron during the month of October shows a new high record with 1,650,205 tons, against 1,589,197 tons in the month of September, and 1,633,539 in the same month last year. This brings the production for the ten months, January-October, to over 15,000,000 tons, against 14,750,000 in 1912, and 12,875,000 in 1911. England must, therefore, not wonder at this country underselling her in her own markets. Some special branches are undoubtedly doing better, conspicuous among them being tubes, of which a fresh provisional syndicate has been patched up until the end of the month, in consequence of which Mannesmann Tube Mills have at once raised prices by 15 to 20 marks ($3.52½ to $4.70) per ton. The wire trade is as depressed as ever, but it relieves itself by pushing the export as much as possible. Thus the rerolled wire syndicate shipped in October 16,400 tons to foreign countries, against 14,100 tons in September. The Steel Syndicate again shows larger shipments in October than in September.

According to rumors circulating in Berlin circles, the Mining & Metallurgical Co., Gelsenkirchen, has obtained an important tube order from Argentina. The Cologne *Gazette* states in this connection that the company has contracted with the Hamburg-Amerika Line and with the Hamburg-South America Shipping Co. for the transport next year of about 60,000 tons of tubes to Buenos Aires.

RUSSIAN IRON TRADE

St. Petersburg, Nov. 12.

During the first six months of the current year the quantity of iron ore produced in the Kertch area was 14,125,000 poods (227,822½ tons), or 1,123,500 poods (18,121 tons) more than in the corresponding period of 1912. There is an enormous increase as compared with the average production of the preceding five years. The producing capacity of the district ac-

cording to houses now exploiting it, is 28,000,000 poods (451,612½ tons).

The Russian iron market continues practically unchanged, being firm in all departments excepting pig iron which shows signs of weakness. Prices quoted on the Kharkoff exchange are: Section iron, 1 rouble 45-58 copecks (75½ cents to 80 cents) per pood; girder iron 1 rouble 46-54 copecks (74 cents to 78 cents); tank iron, 1 rouble 70-75 copecks (86 cents to 88½ cents); roofing iron 2 roubles 10-15 copecks (107 cents to 109½ cents); pig iron, 68 copecks to 70 copecks (34 cents to 35 cents).

Would Dissolve American Can Co.

Government Brings Suit, Alleging Control of Prices and Other Violations of the Sherman Law—President Makes Statement

The American Can Co. was made defendant in a dissolution suit, filed by the United States government Nov. 29 in the federal district court of Baltimore. The American Sheet & Tin Plate Co. was also made a defendant as well as several individuals.

The department of justice in the complaint filed alleges that the American Can Co. controls a large percentage of the business in this country in tin cans, containers and packages made of tin plate. The American Sheet & Tin Plate Co. is named as a defendant because of an alleged agreement it is said to have made with the Can company to sell the latter tin plate at a preferential price.

In the bill of the complaint, dissolution other than on a pro rata basis is asked by means of a separation into the units of various ownerships in order to insure the restoration of competition.

The formal complaint was filed by William T. Chantland, special assistant to the attorney general, and was signed by W. C. Todd, assistant to the attorney general in charge of trust prosecutions. The defendants named are: The American Can Co., The Sanitary Can Co., The Missopri Can Co., The Martin-Wagner Co., The Boston Wharf Co., The Max Ams Machine Co., The Freeman Duncan Transfer & Realty Co., The Hawaiian Pineapple Co., Ltd., The American Sheet & Tin Plate Co., Daniel G. Reid and 26 other individuals. In general the complaint alleges that the defendants restrain interstate and foreign trade in tin cans and are attempting to monopolize this trade. The petition alleges that in the latter part of 1901 the alleged conspiracy and combination in restraint of trade was formed by J. Hobart Moore, William Henry Moore, Daniel G. Reid, Fred S. Wheeler, Henry W. Phelps, William T. Graham, George G. McMurtry and D. Wiley McCaughey. Further, the government alleges that these defendants endeavored to restrain trade in the United States by creating a single corporation with large capitalization and buying or leasing the greater portion of the can and can-making machinery in the United States.

It is said the government hopes to prove that for some time after organization the American company controlled about 85 per cent of the trade. While that quantity is admitted to have diminished, it is said now to be close to 50 per cent and the American company is declared to be the dominating factor in the business.

Alleged Agreement Details

In agreements made with the American company by the concerns it absorbed, they were not to engage in tin can manufacture within a radius of 3,000 miles of Chicago for 15 years subsequent to their acquisition.

The government alleges the combination has at times increased the price of cans and that its domination of the market is so absolute that such independents as have come into being have been forced to follow its prices. It has compelled customers, the government charges, to make long-term contracts to purchase cans exclusively from it and used other methods of getting trade familiar to such combinations.

Pres. F. S. Wheeler, of the American Can Co., made the following statement regarding this suit, today:

"In view of the filing of a suit by the federal government against the American Can Co. under the Sherman anti-trust law, the officers of that company deem it due to the public and to the large number of investors in the stocks of the company to make the following statement:

"While the company regrets that the government has thought proper to bring this suit, it has no fear or misgiving as to the result. Neither in the origin of the company nor in the subsequent conduct of its business has monopoly or restraint of trade been attempted or attained. None of the methods commonly known as 'unfair competition have been employed by the company. It has been party to no agreements or understandings, expressed or tacit, seeking to control or regulate prices, nor has it sought in any way to rule or dominate the industry in which it is engaged.

"It has no such share of that industry—only about one-third—as would enable it to rule or dominate it, even if it had the purpose to do so. Competition is wholly free and keenly active in that industry. The company has striven and will continue to strive to get all of the business it can, profitably, to its stockholders, but it has done and will do this not by futile attempts to monopolize or dominate the trade, but by seeking, through the very best methods of efficient organization of manufacture and of distribution that it knows or can devise, to meet better than others all the rightful needs of those who use its products.

"The company will defend this suit vigorously and confidently, and it is the belief of its officers and of its counsel that neither the company nor its stockholders need feel any alarm or uneasiness as to the outcome."

Present officers of the American Can Co. are:

President—F. S. Wheeler.
Vice President— H. W. Phelps.
Vice President—F. Rudolph.
Secretary and Treasurer—R. H. Ismon.
Assistant Secretary and Assistant Treasurer—R. A. Burger.
Assistant Secretary—W. F. Dutton.
Auditor—C. E. Green.

About a year ago, W. T. Graham retired as president and Mr. Wheeler was elected to that office. Mr. Wheeler had been vice president and treasurer. The company has works at many points throughout the country, including the following: San Francisco, St. Paul, New Orleans, Savannah, Ga.; New Castle, Pa.; Montreal, Philadelphia, Toledo, Atlanta, Detroit, Brooklyn, Cleveland, Baltimore, Richmond, Va.; Portland, Ore.; Fairport, N. Y.; San Jose, Cal.; Indianapolis; Joliet, Ill.; Maywood, Ill., and Niagara Falls, Ont.

Will Consolidate.—The Biddle Hardware Co. and the Supplee Hardware Co., which have long been recognized as among the most important hardware concerns in the country, have announced plans whereby they propose to consolidate. The new concern will be capitalized at $1,000,000, and arrangements have been made for a new building, which will be put up immediately. It is the purpose of the management to run the new concern on co-operative principles and all employes will be given an opportunity to become shareholders.

MEN OF THE IRON TRADE

J. W. CARREL, sales manager of the Lodge & Shipley Machine Tool Co., Cincinnati, sailed for a three months tour of Europe.

A. L. HORR, vice president of the Northwestern Bridge & Iron Co., Milwaukee, resigned to become general manager of the Vulcan Mfg. Co.

F. U. McGRAW, formerly connected with the Pittsburgh office of the Erie City Iron Works, recently resigned, retiring to his farm in Maryland.

JULIAN KENNEDY, consulting engineer, Pittsburgh, spoke on "Municipal Efficiency" before the Up-To-Date club of Youngstown, O., Nov. 28.

ELWOOD HAYNES, automobile manufacturer, Kokomo, Ind., delivered an address on "Stellite" at the monthly meeting of the Engineers' Club, Cincinnati.

FRANK A. BOND, formerly assistant manager of the Standard Chain Co., was recently elected secretary and general manager, succeeding A. E. Crockett, resigned.

RICH CRISP resigned as advertising manager of the Bishop-Babcock-Becker Co., Cleveland, to become vice president and general manager of the Krohmer Co., Chicago.

JAMES A. McALEENAN, formerly connected with the James Lappan Mfg. Co., Pittsburgh, sold his interest in that company and plans to devote his time to private business.

NELSON FLANAGAN, formerly brass foundry superintendent of the C. M. Grey Mfg. Co., East Orange, N. J., is now connected with the Oxweld Acetylene Co., Newark, N. J.

W. E. WATSON, for several years assistant general manager of sales of the La Belle Iron Works, Steubenville, O., in charge of the pipe department, has accepted a similar position with the Youngstown Sheet & Tube Co., Youngstown, O., where he assumed new duties Dec. 1.

COLONEL HENRY P. BOPE, vice president of the Carnegie Steel Co., talked about "Salesmanship" before about 500 salesmen and purchasing agents in the Pittsburgh district Nov. 29 at the Fort Pitt hotel. The event was the first of a series of luncheons, given under the direction of the Pittsburgh Industrial Development Commission.

W. R. STELLING, who has been associated with the Gilson Mfg. Co., gasoline engines, Port Washington, Wis., for a number of years, has resigned to accept the position of sales and advertising manager of the Steiner Mfg. Co., of Chilton, Wis., manufacturing gasoline engines, and recently reorganized following the retirement of H. A. Steiner. Mr. Stelling is one of the best known men in the farm engine field in the middle west.

ALBERT L. HORR, for the past year vice president of the Northwestern Bridge & Iron Co., Milwaukee, has accepted the position of general manager of the Vulcan Mfg. Co., of Fond du Lac, Wis., which has arranged an active campaign for structural business throughout the country. Mr. Horr has had 12 years of experience in the structural field, having spent six years with the Modern Steel Structural Co., of Waukesha, Wis., and being for four years an engineer for the Worden-Allen Co., Milwaukee. In the fall of 1912 he was elected vice president of the Northwestern Bridge & Iron Co., of Milwaukee.

A. E. CROCKETT, secretary and general manager of the Standard Chain Co., Pittsburgh., has resigned to become identified with the Roanoke Refined Iron Co., which has leased the plant of the Loucks Iron & Steel Co., Roanoke, W. Va. The new interest will manufacture melting bars for crucible steel works and refined iron bars. Frank A. Bond, formerly assistant general manager, has succeeded Mr. Crockett as secretary and general manager of the Standard company.

GUSTAV RASMUS, M. E., who was appointed North American representative of Joh. Kleinewefers Sohne, Crefeld, Germany, last August, was graduated from Cornell University, with the degree of M. E., in 1897. Following graduation, he spent some time in the employ of the General Incandescent Arc Light Co., New York, and then took up a scholarship at Tubingen, Wittemberg, Germany. From there he entered the employ of

GUSTAV RASMUS

Siemens & Halske, Berlin, and after eight months returned to the General Incandescent Arc Light Co. From 1901 to 1906 he was successively in the employ of the Bullock Electric, the Western Electric, the New York Interborough Rapid Transit Co. and the New York-New Jersey Telephone Co. From 1906 to 1910, he was engaged in general contracting work in New York City, then became associated with the Jersey City plant of the Crucible Steel Co. of America and later with the Robins Conveying Belt Co. In December, 1912, he was admitted to practice as patent attorney, since which time he has maintained an office at 2 Rector street, New York City. The business of Joh. Kleinewefers Sohne was established in 1862, and they are engaged in the manufacture of cold rolling mill machinery, hydraulic presses, steam hammers, revolving and "liliput" mercerisers and paper and silk rolls, operating one of the largest manufacturing plants in Germany. The American customers include the American Steel & Wire Co. and the Crucible Steel Co. of America.

Proposed Site for Armor Plate Plant

New York, Dec. 1.—That the old plant of Milliken Bros., Inc., at Staten Island, New York harbor, is an ideal location for the manufacture of armor plate is the purport of a petition just forwarded to Hon. Josephus Daniels, secretary of the navy, by the Merchants' Association of New York. Accompanying the petition, is a report giving in detail the equipment of the plant and stating the advantages of its location on tidewater at Staten Island. The tract consists of 160 acres, on which is located an open-hearth plant and rolling mill and also a structural steel fabricating plant, together with adequate railroad trackage and rolling stock, as well as a five-story fireproof office building. Attention also is directed to the fact that the formation of the ground is such as to provide satisfactory foundations for the heavy machinery which would be required in the manufacture of armor plate.

Will Confer With Union.—At a meeting of the executive committee of the Stove Founders' National Defense Association, held in New York, Nov. 19, it was decided to hold the annual conference with the stove molders' union about the middle of December, at Atlantic City. The exact date will not be set for about 10 days. The conference is not expected to develop any radical changes in the relations between the stove manufacturers and their employes.

The Wisconsin Industrial Commission's report on labor conditions within the state says that the demand for labor is falling off and unemployment is increasing. Help wanted at the Milwaukee free employment office decreased 20 per cent in October, 1913, as compared with the corresponding period a year ago.

Oliver Reeder & Son have sold their ship yard at Baltimore to McIntyre & Henderson and E. A. Craig, manager of the Chesapeake Marine Railway Co.

NEW BUSINESS

In New York the machinery market is very quiet and business has fallen off somewhat, as compared with the past two or three weeks. Business in general continues a great deal below normal. Inquiries which are now out are not of such a nature as to lead to the belief that a great improvement may be expected shortly. Second-hand machinery, as compared with new machinery, enjoys a fairly good demand. None of the railroad interests in the east appear to be interested in their machinery requirements at present. Sales to foreign buyers are also falling off in a considerable degree. The present situation, however, it is felt, is what might have been expected in view of the trend of business during the past few months and the approach of the holidays.

In Pittsburgh, machine tool dealers are receiving a fairly large number of single orders, but the market is far from being active and consumers are not expected to buy heavily until after general conditions are more normal. The closing down of departments in some of the iron and steel mills has thrown considerable second-hand machinery into the market, for which there is fair demand. Foundries and machine shops have cut down outputs to a considerable extent, and working forces have been reduced in many instances. Builders of heavy rolling mill machinery are enjoying comparatively satisfactory conditions, and some of the larger interests are well filled up with business taken earlier in the year.

In Chicago conditions surrounding the machine tool trade show little improvement, and the bulk of the business still continues to come in orders for single tools. There is a fairly good demand for boiler and auxiliary machinery for heating plants. The demand for power transmission machinery is helped through the fact that many manufacturers are taking advantage of the slack season to make necessary repairs.

In Cincinnati, the machinery market has grown rather uncertain as to the activities of the different plants, which has been due, in a large extent, to the long period of dullness that has been experienced in this territory. A few manufacturers of machine tools state that they are fairly busy, having recently received several orders, but the majority report business still very slow and unimproved, with small prospects of a betterment before the first of the year, if then. There is an inquiry for a good sized list of equipment from a Chicago school that is expected to be closed within a few days. Foundries are working mostly on old contracts and report that very few new orders have been received recently. Makers of special machinery, such as laundry and sugar machinery, are probably the busiest of all equipment manufacturers here. Business in regards to small electrical equipment continues fair.

ALABAMA

DECATUR.—A four-story, 55 x 100-foot brick addition will be erected to the Lyons hotel at a cost of $30,000.

JACKSON.—The Sample-Williams Clay & Coloring Co. plans to erect a brick manufacturing plant here with a daily capacity of 40,000 bricks.

ARIZONA

TEMPE.—A two-story reinforced concrete addition is to be erected at Tempe Normal school, estimated to cost $75,000. Peabody & Smart, Phoenix, architects.

CALIFORNIA

DAVIS.—The Davis Water Co. has had plans prepared for a 108-foot reinforced concrete tower of 300,000 gallons capacity.

EUREKA. — The Standard Oil Co., San Francisco, plans to erect a distributing plant here estimated to cost about $100,000.

LOS ANGELES.—The repair shops of the Southern California Edison Co. were recently damaged by fire with a loss of $5,000. The company plans to rebuild at once.

MARYSVILLE.—The Yuba Machine shops have been incorporated; $10,000; by C. H. Powell, H. C. DeWitt and M. G. DeWitt.

OAKLAND.—The D. J. Hanlon Co., Alameda, will erect a $100,000 ship-building plant here.

SACRAMENTO.—The Native Sons Hall Association plans to erect a four-story reinforced concrete and brick building estimated to cost about $150,000. Edward Kraus, chairman committee.

SAN FRANCISCO. — The Luckenbach Steamship Co. plans to construct two new steamships estimated to cost about $1,000,000 each, plans for which have been prepared.

SAN FRANCISCO.—The American Steel Bar Mfg. Co. has been incorporated; steel products; $50,000; by W. B. Hinchman, N. B. Elleyr, E. J. Bartholomew, F. M. Doak and G. H. Deane.

CONNECTICUT

BRIDGEPORT.—Bids will be received until Dec. 8 by William B. Boardman, secretary of the board of education for the construction of a three-story brick, 78 x 140-foot high school estimated to cost about $400,000. James Gamble Rogers, New York City, architect.

NORFOLK. — The Neptune Hardware Co. recently began construction on a 60 x 200-foot two-story brick factory here.

WATERBURY.—The Waterbury Clock Co. plans to erect a five-story, 50 x 182-foot brick and mill construction factory here, plans for which have been prepared by E. E. Benedict.

DISTRICT OF COLUMBIA

WASHINGTON.—Sealed proposals will be received at the office of O. Wenderoth, supervising architect, treasury department, until Dec. 27 for the construction complete of the United States post office at Macomb, Ill.

WASHINGTON.—Sealed proposals will be received at the office of O. Wenderoth, supervising architect, treasury department, until Jan. 2 for the construction complete, including mechanical equipment, of the United States post office at Brigham City, Utah.

FLORIDA

PALATKA.—B. W. Budington plans to erect a 50 x 140-foot corrugated iron warehouse estimated to cost $3,000.

GEORGIA

MANCHESTER. — The Manchester Cotton Mills will erect a two-story brick addition estimated to cost $12,000.

TIFTON.—Perryman Moore is erecting a three-story, 100 x 150-foot hotel here.

IDAHO

MIDVALE.—The Adams County Light & Power Co. have asked for permit to build light and power plant.

POCATELLO.—J. D. Browning has applied to state public utilities commission for franchise to build street car line in this city.

POCATELLO.—Engineers Weymouth and Henry, of reclamation service, are preparing plans for increasing pumping capacity at a cost of $120,000.

ILLINOIS

CHICAGO.—The Chicago Gear Mfg. Co. has been incorporated; $20,000; by David E. Cohen, Charles J. Weber and Herman Waldman.

WAUKEGAN.—M. J. Douthitt, city engineer, is preparing plans for a reinforced concrete viaduct over the ravine on Sheridan road estimated to cost about $30,000.

INDIANA

ANDERSON.—The Anderson Sheet Metal Co. has been incorporated; sheet metal; $5,000; by Frank Strough, Edward Hoover and Edwin Clawson, Anderson.

EVANSVILLE.—The John C. Smith Hoe & Tool Co. advises it is rebuilding its factory and will more than double capacity. After Jan. 1, the company will be in the market for several new presses and other machinery.

INDIANAPOLIS.—The Payne Die Casting Co. advises it is making a specialty of die-casting red and yellow brasses and bronzes. Castings have been produced commercially several months previous to incorporation. Facilities are being enlarged and the company is in the market for die shop equipment, furnaces and the like.

MITCHELL.—Bids will be received until Jan. 1 by A. H. Kennedy, Rockport, for water and electric light plant estimated to cost $115,000.

SOUTH BEND. — The Bastin-Morley Co. has been incorporated; gas heaters; $100,000; by James P. Morley, John P. Hayes and J. Morley.

IOWA

MASON CITY.—A two-story, 82 x 120-foot brick armory will be erected here at an estimated cost of $40,000, bids for which have not yet been called for.

KANSAS

DOUGLAS.—Plans are being prepared by Albert C. Moore, Joplin, Mo., for a waterworks to consist of oil engines, driving generators, filtration plant, motor-driven pumping machinery, water mains and a 50,000-gallon tower and tank. Bids will be asked about Dec. 30. C. A. Ogg, city clerk.

TOPEKA.—Bids will be received by O. K. Swayze, county clerk, for four bridges as follows: Fifteenth street bridge over the Shunganunga, $15,560; McKinney bridge, Monmouth township, $8,250; McCauley bridge, Auburn township, $6,980; Mud Valley bridge, Soldier township, $7,460.

KENTUCKY

BEAVER DAM.—The municipality has issued bonds for the purpose of building an electric light plant and water system.

HAZARD.—Power and special equipment for a 1,000-ton mining plant will be purchased by the Kentucky Block Coal Co., of which J. B. Allen is general manager.

LEXINGTON.—The Kentucky Redrying Co. will build a $25,000 plant for handling tobacco. Boilers will be needed. J. H. Cunningham is president.

LOUISVILLE.—The Bills Mirror Plate Co. will need machinery to replace equipment in its plant which was destroyed by fire Nov. 27, with $10,000 loss.

LOUISVILLE.—The Louisville Water Co. will receive bids on the installation of two 400-horsepower water tube boilers until Dec. 16. Theodore Leisen is chief engineer.

LOUISVILLE.—The Louisville Gas & Electric Co. will need eight 500-horsepower boilers for an extension of its new plant, reference to which was made last week. G. Wilbur Hubley is chief engineer.

TAYLORSVILLE.—A steam heating plant will be installed in the new court house, bids on which will be opened Dec. 17. S. K. Baird is county judge.

MARYLAND

BALTIMORE.—Sharp & Dohme will erect a seven-story, 100 x 132-foot addition to their plant. Ellicott & Emmart, architects.

BALTIMORE.—The Coale Muffler & Safety Valve Co. will erect a 115 x 136-foot two-story brick machine shop here.

BALTIMORE. — The Maryland Brass & Metal Works plans to erect a two-story, 46 x 78-foot brick and mill construction addition. Callis & Callis, architects.

BALTIMORE.—Lewis Baer & Co. are receiving bids for the erection of a four-story mill construction brick and concrete warehouse.

MASSACHUSETTS

BOSTON. — The Harvard University Corporation will erect a six-story brick and stone office building on Federal street at a cost of about $100,000. A. Lawrence Lowell, Cambridge, president.

BOSTON.—Wiliam Chapman, R. C. Sturgis and Richard B. Andrews, architects, have been commissioned to prepare plans for erecting the new wing to the state house, for which an appropriation of $900,000 has been made.

CHELSEA.—The Russell Box Co. plans to erect a three-story brick and mill construction addition. Frederick S. Hinds, Boston, architect.

NATICK.—The Natick Steel Equipment Co. has been incorporated; $10,000; by George W. Travis, William H. Colby, M. J. McGlone, et al., Natick.

NORTH ADAMS.—The American Carbide Co. recently purchased a site here, upon which it plans to erect a new plant. John W. Nibbs is interested.

WHITMAN.—The G. G. Roberts Corporation has been incorporated; hardware; $50,000; by George G. Roberts, George G. Roberts Jr., et al., Whitman.

MICHIGAN

BATTLE CREEK.—The LaPorte plant of the M. Rumely Co. is to be moved here and consolidated with the company's local plant. Additional machinery will be purchased. Between 650 and 800 engines and 12 to 15 boilers are manufactured at the plant here a week. Charles S. Funk, president.

BAY CITY.—The United States Pipe Co., manufacturer of corrugated pipe for culverts and iron bridges, plans to move its plant from Battle Creek to this city. The company recently purchased a site from the Detroit, Bay City & Western railroad, upon which it plans to erect a 60 x 100-foot factory building.

DETROIT.—The Monarch Pattern Works has been incorporated to manufacture patterns with a capital of $10,000.

SAULT STE. MARIE. — The Northern Foundry Co. plans to erect a new machine shop to take the place of the present shop. The plant will cost about $12,000 exclusive of equipment. The new building will be erected over and around the present structure. Plans call for a steel and brick structure.

MINNESOTA

GRANITE FALLS.—Bids will be received until Dec. 9 by S. O. Tjosvold, county auditor, for the construction of five steel and concrete bridges and six concrete and 22 corrugated iron culverts.

MISSOURI

HOPKINS.—Bids will be received until Dec. 10 by T. W. Porter, city clerk, for the construction of a water-works system, estimated to cost about $12,000.

OZARK.—Christian county will erect a court house and jail 60 x 70 feet and 40 x 40 feet of fireproof construction. Estimated cost $80,000. Architect not yet selected. Address proposals to S. E. Bronson, superintendent.

ST. LOUIS.—The Pneumatic Devices Co. has been incorporated; door device; $50,000; by Nelson S. Gotshall and Henry B. Graham.

ST. LOUIS.—The Eureka Brass Mfg. Co. recently purchased a site with 300 foot frontage, upon which it plans to erect a foundry for the manufacture of brass, bronze and aluminum castings. Plans call for a fireproof brick structure estimated to cost about $50,000.

WEBSTER GROVES. — The Southwestern Telegraph & Telephone Co., Dallas, Tex., recently purchased a site 95 x 265 feet, upon which it plans to erect a new exchange building.

NEW JERSEY

BAYONNE.—Bids will be received Jan. 1 by the American Cotton Oil Co. for the erection of oil refineries at Kill Von Kull at an estimated cost of $500,000. Plans are being prepared by A. G. Zimmerman, New York City.

EAST ORANGE.—The Ward Bakery Co., Newark, plans to erect a five-story, 205 x 290-foot bakery here, plans for which have been prepared.

METUCHEN.—J. B. Owens, New York City, recently purchased a site here, upon which he plans to erect a $10,000 plant for the manufacture of art tile and mantels.

NEWARK.—Dr. Leo Stein, Upper Montclair, N. J., and John E. Dehls, New York City, have purchased a site here, upon which they plan to erect a factory for the manufacture of brewers' supplies. Estimated cost about $40,000.

NEW YORK

ALBANY.—The sash and blind factory of the William H. Burton Co. was recently damaged by fire. Loss $15,000.

ANTWERP.—The plant of the Feed & Supply Co., recently damaged by fire, will be rebuilt at an estimated cost of about $40,000.

BROOKLYN.—The Franklin Kent Corporation has been incorporated; metal products; $100,000; by Edwin B. Stimson, William F. Kosilak and Walter H. Wood, 20 Broad street, New York City.

BUFFALO.—The Meyer Motor Car Co., Inc., has been incorporated; $50,000; by Arthur W. Meyer, Clayton H. Meyer, Franklin D. L. Stowe, Buffalo.

GENEVA.—The Phillips & Clark Stove Co. is erecting a 60 x 100-foot, four-story brick addition.

MANHATTAN.—The Kleinschmidt Electric Co., Inc., has been incorporated; $100,000; by Bernard Kleinschmidt, Wm. Kleinschmidt and Frederick Kleinschmidt, 429 East Fifty-eighth street, New York City.

MINEOLA.—Two additional wings are to be erected to the court house at a cost of about $200,000, plans for which are being prepared by William B. Tubby, New York City.

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THE IRON TRADE REVIEW
Publisher
CLEVELAND, OHIO

er of boxes, plans to erect a three-story, 50 x 100-foot factory estimated to cost about $25,000, plans for which have been prepared by Merrit C. Conway.

SYRACUSE.—The F. S. & D. Mfg. Co. advises it is incorporated to manufacture an automobile heater. It is of aluminum, utilizing the exhaust from the engine. A factory is to be erected next spring, including foundry and machine shop. Other specialties are to be manufactured also. Officers are: President, G. N. Deas; vice president, James W. Farrar; secretary-treasurer, Allen H. Smith; manager, Vern R. Smith.

UTICA.—The Utica & Mohawk Valley Cotton mills will erect a two-story, 63 x 164-foot addition.

UTICA.—The Spring Valley Chemical & Mfg. Co. is erecting a 140 x 160-foot and a 50 x 150-foot addition.

WATERVLIET.—The erection of a new city hall to cost $60,000 is under consideration.

NORTH CAROLINA

CONCORD.—The Cabarrus Motor Co. has been incorporated; $10,000; by Parks McLafferty, J. C. McCanless and E. A. McCanless.

OHIO

CANTON.—The Wheeling & Lake Erie railroad plans to erect a freight house here estimated to cost about $100,000.

CANTON.—The Knight Tire & Rubber Co. recently began construction on three additions, two buildings to be three stories, 75 x 125 feet, and the other, two stories, 55 x 125 feet. Estimated cost $110,000.

CHILLICOTHE.—The Mead Paper & Pulp Co. plans to erect a $450,000 addition to its plant here.

CINCINNATI.—Some light equipment to be used for repairing automobiles will be needed by the Government Square garage, which will be located on Fifth street, near Main street, Cincinnati. The site is 33 x 110 feet with an L 50 x 66 feet. E. H. Maffey, of Cincinnati, will be the proprietor of the garage.

CINCINNATI.—Bids will be received until Dec. 9 by the Board of Hospital commissioners, Cincinnati, for the following equipment to be used in the new Tuberculosis sanitarium: Boilers, stokers, smoke connections, coal cars, tracks, scales, refrigerating plant and laundry equipment. Walter G. Franz, Cincinnati, is the engineer in charge.

CINCINNATI.—New equipment for the manufacture of boxes will soon be required by two firms in Cincinnati. McWilliams & Schulte will increase the size of their plant at Court and McLean streets, and P. T. Baker & Son will build an addition with a frontage of 200 feet to their factory on West Liberty street.

CINCINNATI.—From all indications, a 12-story loft and light manufacturing building will be erected at the southwest corner of Sixth and Sycamore streets, Cincinnati, by Val Duttenhofer, of that city. The site which is 90 x 140 feet, has been purchased for $100,000. It is estimated that the building will cost about $300,000. Estimates and sketches are now being prepared by several firms of architects.

COSHOCTON.—The county commissioners will issue $100,000 in bonds for the rebuilding of bridges destroyed by the floods last March.

GALION.—The Galion Iron Works, Galion, O., has increased its capital stock from $10,000 to $100,000. It is expected that some extensive additions will be made to the plant.

MT. VERNON.—The C. & G. Cooper Co. is installing three 21½ x 24 twin tandem gas engines for the Southern California Gas Co., Taft, Cal. The same size installation is being put in at Bigheart, Okla., for the Quapaw Gas Co. These bring the output of Cooper gas engines for 1913 to over 10,500 horsepower.

TIFFIN.—The Baltimore & Ohio railroad plans to construct a concrete dam near Kellers Station west of here at a cost of $65,000.

TOLEDO.—The Duncan Co. is to build a storage and office building, plans for which will be ready shortly for bidders.

OKLAHOMA

OKLAHOMA CITY.—The American Rail Joint Co. has been incorporated; rail joints; $50,000; by W. F. Baker, A. J. McMahan and T. J. McMahan.

TULSA.—The Succor Rod Pulling Machine Co. has been incorporated; pulling machines; $10,000; by W. B. Bryan, J. B. Dunlap and Peter Deichman.

OREGON

BEND.—The plant of the Bend Sash & Door Co. was damaged by fire. Loss of $6,000.

CLATSON.—Town trustees have granted a franchise to Seaside Light & Power Co. to extend wires and poles through town.

EUGENE.—Voters of Oregon have authorized $175,000 bond issue for new buildings for state university.

LA GRANDE.—P. A. Foley will erect an eight-story brick and steel hotel building at a cost of $125,000.

PORTLAND.—The plant of the Pacific Cooperage Co. was damaged by fire. Loss $40,000.

PORTLAND.—H. W. Downing, architect, Abington building, is drawing plans for $250,000 apartment house.

PRINEVILLE.—The Deschutes Power Co. will replace steam pumps with centrifugal, 800-gallon pump and a 200-gallon Gould pump.

SANDY.—Botkin & McCormick have applied to council for franchise to stretch power wires through town.

PENNSYLVANIA

CRESCENTDALE.—The Crescent Portland Cement Co. is installing two 1,500-kilowatt Curtis turbines to operate General Electric generators, vacuum pumps, condensing and electrical apparatus.

FRANKLIN.—The Eclipse Oil Works plans to make additions to its plant here estimated to cost $100,000.

HARRISBURG.—The Atlantic Coal & Iron Co. has been incorporated to manufacture and deal in iron, steel and other metals; $100,000; by M. C. Miller, E. First, Harrisburg; W. J. Maloney, Wilmington, Del.

PITTSBURGH.—The Epping-Carpenter Pump Co. has taken a contract for a 12,000,000-gallon crank and fly wheel pumping engine for the city of Jacksonville, Fla.

PITTSBURGH.—The Jackson Engineering Co., Pittsburgh, has received an order for a 26 x 48-inch Allis-Chalmers engine from the Thornton Fire Brick Co., Thornton, W. Va.

PITTSBURGH.—The Heine Safety Boiler Co., St. Louis, through its Pittsburgh office, will install four 250-horsepower water tube boilers in the boiler plant of the municipal water works at Erie, Pa.

PITTSBURGH.—The Mesta Machine Co. will equip the blowing engines at the blast furnace of the Girard Iron Co., Girard, O., with air heads, provided with new Mesta plate valves.

PITTSBURGH.—Max Solomon, owner of the Wheatland Rolling Mill, Wheatland, Pa., denies a report, circulated by newspapers in this district, that the plant soon will be put into operation.

PITTSBURGH.—The Kerr Turbine Co., Wellsville, N. Y., represented by R. M. Rush, Oliver building, Pittsburgh, will install two large turbine-driven centrifugal pumps to supply feed water for the new power plant of the Youngstown Sheet & Tube Co., Youngstown, O.

PITTSBURGH.—The Green Engineering Co., Pittsburgh, has taken a contract from Dilworth, Porter & Co., Ltd., this city, for the installation of pneumatic ash-handling equipment. Orton & Steinbrenner, Chicago, will install coal-handling equipment in the Dilworth-Porter plant.

SUNBURY.—The Sunbury Water Co. plans to construct a pumping station estimated to cost $15,000, contract for which was recently awarded to H. E. Ahrens. Reading, Pa.

SOUTH DAKOTA

WATERTOWN.—The Farmers' Oil Tractor Co., Charles City, Ia., plans to move to this city, where a new plant will be erected, site for which has been secured.

TENNESSEE

NASHVILLE.—Boilers and special machines will be needed for a laundry to be established here by D. M. Bright.

NASHVILLE.—A veneer mill will be built and equipped by A. B. Ransom and others. A boiler, engine and rotary lathe will be purchased. His company has $15,000 capital stock.

OOLTEWAH.—J. P. Parker will be in the market for motors and knitting machines for an underwear or hosiery mill which he will establish here.

TEXAS

ABILENE.—Taylor county commissioners will erect a three-story fireproof, 80 x 140-foot court house, estimated to cost $150,000.